PRE-DESIGN CONCEPT REPORT
GRAND CANAL RESTORATION

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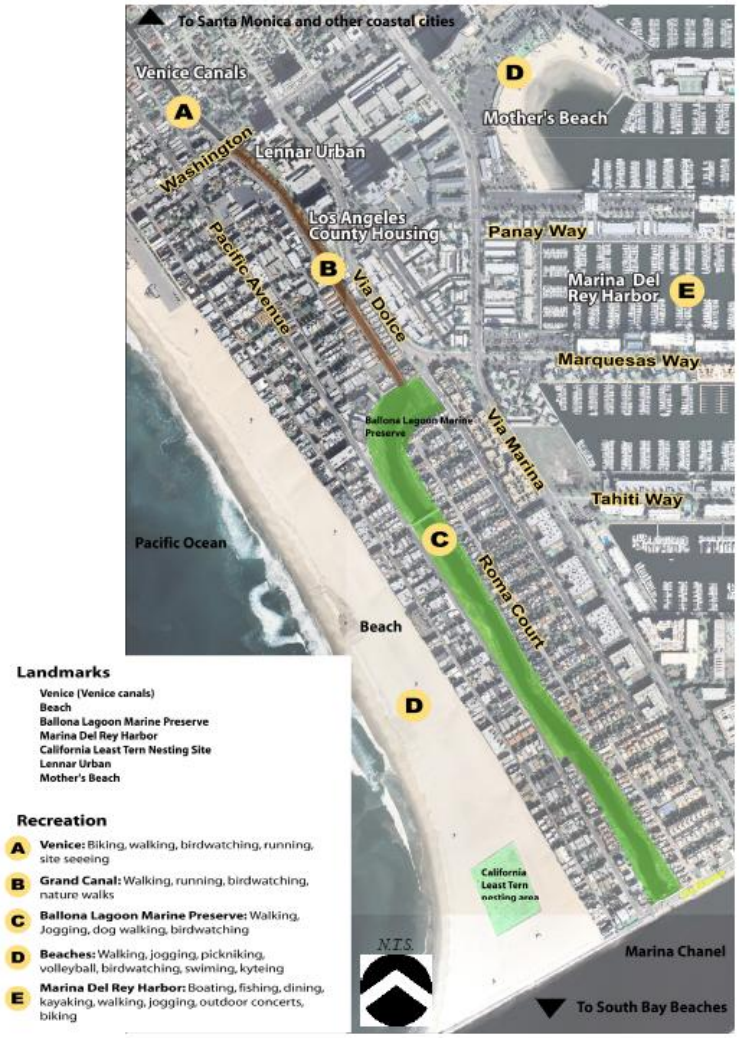
1.0 Executive Summary

1.1 Project Background

The Grand Canal is an important tidal waterway in the Venice community of Los Angeles, California, that connects the canal system of Venice to the Ballona Lagoon, Marina Del Rey Channel, and the Pacific Ocean.

Figure 1-1
Grand Canal Vicinity Map



The Canal, its banks and adjacent lands have been impacted over the years from many sources and are in need of restoration. The goal of the City of Los Angeles is to improve the natural habitat value of the channel and banks of the Grand Canal while maintaining,

and improving where feasible, flood protection, tidal flushing, stormwater quality, and public access.

With these goals in mind, the City contracted with Psomas and its team of specialists to characterize the existing physical and biological conditions within the study area, identify potential restoration alternatives and estimate their costs; and recommend which alternative actions should be implemented and how they should be phased. Efforts were coordinated with a public involvement process orchestrated by the City. Reports dealing with each area of expertise are found in the appendices, this report summarizes and integrates the key recommendations.

1.2 Existing Conditions

Grand Canal extends approximately 2,000 feet (0.37 miles) and averages approximately 50 to 75 feet wide. It is a publicly-owned right-of-way with public infrastructure including concrete sidewalks, sewer and storm drain infrastructure as well as both wetlands and disturbed lands. The Grand Canal is located immediately to the north of the Ballona Lagoon Marine Preserve (BLMP) and is connected via tidal waters, which enter the BLMP through a tide gate at the Marina del Rey boating entrance. The 405 and 90 freeways are the two nearby freeways located to the east of Grand Canal. The region is home to a landscape of unique ecological, social and cultural diversity.

Existing conditions were analyzed in four areas: 1) hydrology, 2) access, 3) biology, and 4) storm water quality/erosion.

1.2.1 Hydrology

The **hydrological** existing condition examined was not the actual current condition because plans are underway for the proposed Marina del Rey Tide Gates Rehabilitation. As requested by the City, the modeling of the existing condition is based on design drawings of the County of Los Angeles Gate Rehabilitation design (LADPW 2007) provided by the City. Since the Grand Canal is exposed to oceanic tides via tide gates at the mouth of Ballona Lagoon that connect to Marina del Rey and Santa Monica Bay, the configuration of the Marina del Rey tide gates is the primary determinant of the water levels in the Grand Canal. Under existing conditions, the average tide range in Grand Canal varies between -1.3 ft MSL and 1.9 ft MSL from mid-April to mid-October (Dry mode) and between -1.3 ft MSL and 0.3 ft MSL from mid-October to mid-April (Wet-mode). The maximum water level is determined by the Marina del Rey tide gates' operational settings which is described in the County design. The planned rehabilitation of the Marina del Rey tide gates has sufficient conveyance capacity that water levels in the Grand Canal closely follow oceanic tides, except when limited by bed elevation or tide gate closures.

1.2.2 Public Access

Public access was analyzed principally in terms of pedestrian and vehicular access. Two areas of particular interest are Strongs Dr. from Washington Blvd. to Driftwood, and pedestrian access on the east side of the canal from house 3511 to 3621, and from there to 3815. Public access is restricted in the first stretch and below the tideline in the second.

The west side of Strongs Dr. currently accommodates twelve non-metered parking places and seven metered spaces. On the east side of Strongs Dr. there are six metered parking spaces and 35 non-metered spaces. However there is no sidewalk or designated trail along this stretch. As a result, the banks of the canal have become the de facto trail and habitat has suffered. The following other issues were also identified:

- Lack of disability access
- Lack of pedestrian connection between east and west side of Canal
- Lack of park space defining entrance to Grand Canal
- Lack of demonstration areas for interpretive learning
- Lack of gathering areas
- Lack of recreation amenities and signage
- Lack of connections to landmarks within the regional scale

1.2.3 Biological Resources

Biological resources were analyzed in terms of the presence of specific native and non-native biological species. A wetlands delineation was also performed. A total of 15 native plant species were observed; Pickleweed dominated the salt marsh vegetation. Some wetlands plants were observed in the east-side trail as it is sometimes below the tidal water level. Observed special status species include Wooly Sea-Blite, Brackish-water Snail, Snowy Egret, and Great Egret. Special interest species include, for example, Fiddler Crab and California Sea Lavender. Existing conditions of the various study areas include degraded upper banks, some of which have been trampled, and some are covered with exotic plants; erosion from stormwater flows; debris scattered on the canal bottom; and weedy undeveloped parcels.

1.2.4 Storm Water Quality/Erosion

Existing **stormwater** conditions were analyzed in terms of drainage areas, land uses and their pollutants of concern, and flows/volumes during a .75 inch and 10-year 24-hour storm event. Land uses in the watershed are mainly high density single family and multi-family with commercial and retail uses adjacent to Washington Blvd. Pollutants from these land uses are varied however, trash and bacteria are particular pollutants of concern. According to the Bureau of Engineering Drainage Map (July 2007), stormwater on the west side of the canal generally runs overland from Pacific Ave. down the streets directly into the Grand Canal. Several west-side streets also have drains, usually small, which discharge directly to the Canal. Both overflows and drain inlets to the Canal have eroded

the banks. One major drain enters the Grand Canal from the east at Via Dolce at the city-owned property adjacent to the County residential facility across from Driftwood. Runoff is not treated except for Stormceptors installed at Washington and Strongs (2400 gallon) and at Via Dolce across from Driftwood (7200 gallon). These remove oil and grease and sediment.

1.3 Alternatives Evaluation Summary

Two alternatives for physical changes to the Grand Canal area have been developed and examined. The objectives of these approaches are to establish a balance of ecological habitat types, address endangered species and exotic species concerns, increase stability of the banks, improve water quality through improved stormwater management, and balance public access, flood protection and protection of wildlife. Both alternatives are based on the recommended hydrological structure and operational regime and provide somewhat different mixes and benefits of public access, stormwater management and biological restoration.

Hydrology – The recommended hydrology approach is to maintain the structural changes of the tide gate rehabilitation under way, but to modify it operationally in order to maximize the winter period tidal regime to allow for the most inundation of wetlands plant species. Also by reducing the duration of restricted tidal range and residence time, this operational approach would reduce the duration of freshwater inundation following flood events.

Key recommendations as to operation of the gates are:

- The Marina del Rey tide gates should be operated so that the Wet Mode is only implemented in response to storm forecasts. An analysis of 13 years of daily rainfall in Santa Monica provided a hindcast estimate of the annual frequency at which the gates would be operated in Wet Mode. If the Wet Mode was implemented for two days on either side of any rainfall 0.25 inches or greater, the gates would have been set to Wet Mode for an average of 13% of the 13-year precipitation record. For the driest (2002) and wettest (2005) water years of this record, Wet Mode would have been in effect 7% and 20% of the time, respectively.
- The Washington St tide gates should not be opened for extended periods of time. When the culverts were open, high tide water levels decrease and low tide water levels increase by a similar magnitude of 0.3 to 0.6 feet. Even if the culverts were opened for a maximum of three 6-hour periods per week (10% of the time), the impacts on the integrated water level statistics (MHHW, MLLW, annual inundation frequency, etc.) should be small.
- An OM plan should be developed along the lines outlines in the Hydrology Appendix.

Because public access treatment provides the most distinguishing differences between the alternatives, the alternatives are presented with access discussed first.

1.3.1 Alternative 1

1.3.1.1 Pedestrian Circulation

In alternative one, the **west side** of the Canal bank along Strongs Drive will have a defined six-foot pedestrian trail adjacent to a three-foot high fence that will provide shelter to proposed biological restoration and will be installed adjacent to all walking paths along the Canal in order to avoid trampling of vegetation. The new trail will connect with the existing concrete pathway running from Strongs Drive and Driftwood Street to Hurricane St. connecting eventually with the not yet restored west bank of the Ballona Lagoon Marine Preserve. A pedestrian bridge will be located at the intersection of Strongs Dr. and Driftwood St., providing pedestrians the ability to cross over to the east side of Grand Canal. The bridge will lead visitors to and from one of the three proposed gateway parks and also to currently underutilized parking along Via Dolce. On the **east side** a new path will be installed from Washington to the new entrance park with a continuation path to the **sidewalk adjacent to Via Dolce**, which will lead pedestrians, through signage, to the entrance of the sand dune park, the second east-side park, or beyond to the entrance to Ballona Lagoon Marine Preserve.

1.3.1.2 Parking and Vehicle Circulation on Strongs Dr.

A distinguishing factor of this alternative is that, with the addition of a walking path and landscape division from the road from Washington to Driftwood along Strongs Dr., traffic on Strongs becomes one way only and parking is eliminated. Fire Department code can be met with this approach.

1.3.1.3 Habitat Restoration

Along Strongs Dr., habitat will be restored up to the current curb. Along the east side across from Strongs Dr., non-natives will be removed and native habitat will be planted. Along the houses on the eastern side, the existing concrete path along the canal will be broken and cobble will be added to provide tidal habitat. The area from house #3511 to #3621 along the canal will be restored to habitat. The recommended approach to bank restoration is to enhance the bank in its current profile other than where areas have been damaged by erosion. The compacted and degraded topsoil could either be replaced or disked and improved. Existing wetlands vegetation would be retained and would be enriched with additional native wetland species representative of similar habitats elsewhere in the Ballona Wetlands Ecosystem.

1.3.1.4 Stormwater Management

The landscaped separation between the path and the street along Strongs Dr., in this alternative, is principally dedicated to a bioswale/bioretention area that treats runoff along the length of Strongs Dr. minimizing flows reaching Driftwood and managing flows from Anchorage and Washington Blvd. as well. Rain Gardens combined with pervious

pavement and Filterra units will be installed to treat stormwater from west side streets dead-ending at the Canal (Galleon St., Fleet St., and Eastwind St.) And Hurricane St. drainage area runoff will be managed in a low flow bioswale – the centerpiece of Hurricane Park. Low flows from the Via Dolce drainage area will be treated with a bioswale/treatment wetland system also.

Alternative 1 is shown in Figure 1-2, below.

Figure 1-2
Alternative 1

1.3.2 Alternative 2

1.3.2.1 Pedestrian Circulation

In alternative two, the west side (Strongs Drive) of the Canal bank will have a defined six-foot pedestrian trail which will be installed partly where the top of the bank and informal walking area is now located. There will not be a landscape separation between the path and the road. The same three foot high fence described in Alternative 1 will be used in this alternative. The trail will also connect with the existing concrete pathway beginning at Strongs Dr. and Driftwood St., leading to the end of Grand Canal. A pedestrian bridge will also be located at the intersection of Strongs Drive and Driftwood. While a pathway will also lead to the sidewalk adjacent to Via Dolce, in this alternative **pedestrians will also have access to the east side of the bank through a walkway from house 3511 to the end of Grand Canal.**

1.3.2.2 Parking on Strongs Dr.

By moving the trail partly on to the bank where the informal trail is now located and by eliminating the landscape buffer, parking can be retained along the eastern side of Strongs with the street running one way only. This alternative also meets fire access code.

1.3.2.3 Habitat Restoration

Less of the bank is restored along Strongs Dr. in this alternative. Also less habitat is created on the east side as the access adjacent to the canal, where habitat is restored in Alternative 1, is used for pedestrian access.

1.3.2.4 Stormwater Management

Because the landscape buffer is not part of Alternative 2, the bioswale along Strongs Dr. is not included. It is replaced, however with a series of Filterra units. Other stormwater elements remain the same.

Figure 3 shows the main elements of the second alternative.

Figure 1-3
Alternative 2

1.4 Recommended Alternative and Phasing

1.4.1 Evaluation

1.4.1.1 Alternative 1

Strengths

- Meets city's low impact access recommendations
- Preserves and enhances natural character of Grand Canal
- Increases wildlife watching opportunities
- Enhances pedestrian use of Via Dolce
- Enhances ability to use under utilized parking on Via Dolce
- Maximizes use of existing city lots for public use

• Assists with better fire access on Strongs Drive
• Protects to the greatest extent possible the ecological integrity of an important coastal resource designated as ESHA (Environmentally Sensitive Habitat Area) by the California Coastal Commission

Constraints

• Residents may not respect boundaries on east side of Canal where habitat is restored.
• Parking directly on Strongs Dr. is reduced and must be made up via the walking bridge to parking on Via Dolce
• Cost of removal of structures and non-natives may be elevated
• Coastal Commission permitting may be more complex.
• Possible dispute among home owners
• Cost of park installation may be elevated

1.4.1.2 Alternative 2

Strengths

• Enhanced access
• Enhanced water views for pedestrians adjacent to east side of Canal
• Protects existing access
• Coastal Commission permitting may be less complex.

Constraints

• Possible opposition from some residents
• High cost associated with installation of proper walking path above high tide levels
• Decreased opportunities for wildlife gathering areas
• Decreased protection of ESHA (Environmentally Sensitive Habitat Area) as designated by the California Coastal Commission
• Decreased opportunities for wildlife watching
• Does not meet city's low impact access recommendations

Alternative 1 is the recommended alternative.

1.4.2 Phasing

Projects have been grouped in areas for phasing of implementation. It is recommended that the projects be implemented in the following groupings and possibly in the following order:

1) Stormwater management measures and adjacent bank restoration and trail disability access on end streets with least complex issues. These can be completed most quickly and serve as a model for the others. These are at Galleon, Fleet, and East Wind.
2) East bank from Washington to city property – trail and restoration planting of banks.
3) West Bank from Washington to Driftwood – revise traffic in one direction and restore bank, construct trail and fence and install Strongs Dr. stormwater treatment measures.

4) City property entrance park at Via Dolce, pedestrian bridge, vegetation and habitat restoration and stormwater treatment measures at Park and at Driftwood. Signage for project components to date.

(Number 3 and 4 should be implemented as part one and two of the same project.)

5) Hurricane stormwater treatment park, observation platform, eastside concrete path broken- up into habitat area. Revisions to remainder of east side bank restoration from new entrance park to border with Ballona Lagoon. Completion of educational signage.
6) Complete additional fencing.
7) Sand Dune Park.

1.5 Project Cost Estimate

Pre-Design Concept Cost Estimate
Summary for Recommended and Second Alternative

	Recommended Alternative	Second Alternative
Access	$1,987,096.00	$957,536.00
Biology	$2,689,945.00	$2,441,344.00
Storm Water	$2,290,536.00	$2,054,014.00
TOTAL	**$6,967,577.00**	**$5,452,894.00**

1.6 Project Implementation Issues

To proceed to project implementation, a number of issues must be addressed. These include:

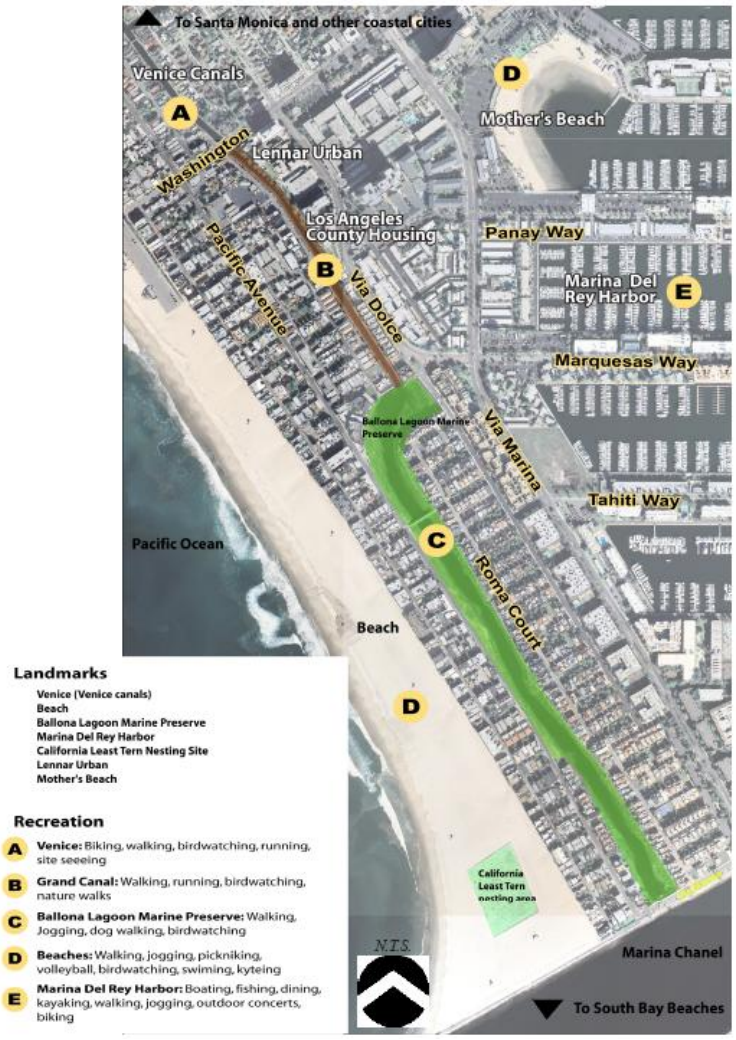
- The City has not allocated funds for project design and construction;
- Funding from grants and other sources may need to be pursued;
- Permits will need to be obtained including Coastal Commission permits;
- The City Department of Transportation will need to approve access and one-way street configurations, and issues related to non-standard street sizes;
- Maintenance issues and responsibilities will need to resolved;
- Operational details for the tide-gates will need to be resolved;
- A geotechnical analysis and detailed survey should be performed;
- A traffic consultant will need to confirm parking and traffic configurations;
- Park implementation will require buy-in from multiple City departments and agreements relative to long term needs.

2.0 Project Background

2.1 Location

The Grand Canal is an important tidal waterway in the Venice community of Los Angeles, California, that connects the canal system of Venice to the Ballona Lagoon, Marina Del Rey Channel, and the Pacific Ocean.

Figure 2-1
Grand Canal Vicinity Map



Grand Canal is the northernmost terminus of what was once a vast coastal marsh and lagoon system created historically by the confluence of the Los Angeles River, Walnut Creek, Centinela Creek and Ballona Creek. Three of the tidally influenced lagoons, including the Grand Canal, which are part of this ecosystem are owned by the City of Los

Angeles (a fourth tidally influenced lagoon, known at Oxford Lagoon, is owned by the County of Los Angeles), whereas the 600+ acres of estuary, saltmarsh, freshwater marsh and prairie grassland known as the Ballona Wetlands Ecological Reserve is owned by the State of California.

The Canal, its banks and adjacent lands have been impacted over the years from many sources and are in need of restoration. The goal of the City of Los Angeles is to improve the natural habitat value of the channel and banks of the Grand Canal while maintaining, and improving where feasible, flood protection, tidal flushing, stormwater quality, and public access.

2.2 Historical Landscape

Historically, Grand Canal was connected to a natural coastal lagoon nestled between large sand dunes. To the west of the lagoon the Pacific Ocean would feed the lagoon with diverse marine life. To the east, the Los Angeles River, fed by tributary streams, ran through the coastal landscape (now Washington Boulevard) of wetlands, meeting the Ballona Lagoon at the end of its journey before it reached the ocean. During the beginning of the 1900s fresh and salt water marshlands, located where the canals are currently situated today, became part of "Venice of America" a subdivision project. During the same period Grand Canal was subdivided into small parcels of land for beach cottages. Sidewalks were constructed along the banks on Venice canals, including Grand Canal (see Figures 2-2 through 2-5).

Figure 2-2
Port of Ballona, now Playa del Rey, early 1900's

Figure 2-3
Dredging out marshlands, 1905

Figure 2-4
Filling of canals, 1927

Figure 2-5
Historical aerial view, 1947

Due mainly to the Great Depression of the 1930s the original "Venice of America" canals system fell into disrepair. In the early 1920s the community of Venice initiated plans to fill the canals and convert them into roadways. Maintenance of the canals was costly and demanding. Twenty years after the canals were originally built the automobile had become the American way of life and narrow alleys and steep bridges of the canal area had become a liability. Ongoing lack of maintenance had left the canals in a state of disrepair. The annexation of Venice into Los Angeles postponed the project to fill the canals until 1927 when the Los Angeles Board of Public Works solicited bids from contractors for commencement of the work. The residents in the canal area have been attempting to restore the remaining canals since the 1960s. The Venice Canals, located north of Washington Boulevard were rehabilitated 1993. The segment of Grand Canal

that is currently proposed to be rehabilitated is the only segment of the historic canal system that has not been improved.

This pre-design report characterizes the existing physical and biological conditions within the study area, identifies potential restoration alternatives and estimates their costs; and recommends which alternative actions should be implemented and how they should be phased. Efforts were coordinated with a public involvement process orchestrated by the City. Reports dealing with each area of expertise are found in the appendices, this report summarizes and integrates the key recommendations.

3.0 Existing Conditions

Grand Canal extends approximately 2,000 feet (0.37 miles) and averages approximately 50 to 75 feet wide. The Grand Canal is located immediately to the north of the Ballona Lagoon Marine Preserve (BLMP) and is connected via tidal waters, which enter the BLMP through a tide gate at the Marina del Rey boating entrance. The 405 and 90 freeways are the two nearby freeways located to the east of Grand Canal. The region is home to a landscape of unique ecological, social and cultural diversity.

Existing conditions were analyzed in four areas: 1) hydrology, 2) access, 3) biology, and 4) storm water quality/erosion.

3.1 Hydrology

The **hydrological** existing condition examined was not the actual current condition because plans are underway for the proposed Marina del Rey Tide Gates Rehabilitation. As requested by the City, the modeling of the existing condition is based on design drawings of the County of Los Angeles Gate Rehabilitation design (LADPW 2007) provided by the City. Since the Grand Canal is exposed to oceanic tides via tide gates at the mouth of Ballona Lagoon that connect to Marina del Rey and Santa Monica Bay, the configuration of the Marina del Rey tide gates is the primary determinant of the water levels in the Grand Canal. Under existing conditions, the average tide range in Grand Canal varies between -1.3 ft MSL and 1.9 ft MSL from mid-April to mid-October (Dry mode) and between -1.3 ft MSL and 0.3 ft MSL from mid-October to mid-April (Wet-mode). The maximum water level is determined by the Marina del Rey tide gates' operational settings which is described in the County design. The planned rehabilitation of the Marina del Rey tide gates has sufficient conveyance capacity that water levels in the Grand Canal closely follow oceanic tides, except when limited by bed elevation or tide gate closures.

Additional details are provided in Appendix A.

3.2 Public Access

Public access was analyzed principally in terms of pedestrian and vehicular access. Two areas of particular interest are Strongs Dr. from Washington Blvd. to Driftwood, and pedestrian access on the east side of the canal from house 3511 to 3621, and from there to 3815.

3.2.1 Recreation and Landmarks

A variety of historical landmarks and recreational facilities exist around Grand Canal and surrounding communities. Washington Boulevard, which is the main street adjacent to Grand Canal, serves as a major attraction point as its western terminus is at the county beach parking lot. Many commercial and retail activities such as restaurants and clothing shops are located on both the north and south side of the street. High-density residential buildings and single-family homes surround the entire length of Grand Canal. During extensive site visits to Grand Canal the public access team noticed that a range of activities occur within and around the lagoon, such as dog walking, sun bathing, jogging, cycling, bird watching and bird feeding. The nearby county beaches provide activities, such as volleyball, picnicking and fishing at the local pier. The Marina del Rey Harbor provides residents and visitors with a variety of water activities, such as motor-boating, kayaking, and sailing, and also including outdoor concerts during the summer months. The adjacent Venice Canals and the famous Venice Boardwalk attract hundreds of national and international visitors every year. The lack of a proper walking path, signage and overall accessibility to the site, as well as neglected maintenance, deter most visitors.

3.2.2 Pedestrian Circulation

In order to provide circulation throughout Grand Canal it was important to identify and prioritize the type of public access that was appropriate at the scale of such a confined, relatively small site. Currently residents and visitors access the site through a variety of ways, including walking, cycling and vehicular (both automobiles and public transportation.) Pedestrians utilize the west and east side of the lagoon banks to walk from Grand Canal to Ballona Lagoon, the beach or the marina. The east side of the bank is currently under construction, however, the former pathway, which now being re-installed, connects the east bank of Grand Canal from Washington Boulevard to Driftwood Street onto Via Dolce (see Figure 3-1).

Figure 3-1
Existing Pedestrian Circulation

3.2.2.1 East Bank

The east side of Grand Canal from Driftwood Street, house 3511, to the end of Grand Canal, house 3815, where Ballona Lagoon Marine Preserve starts, includes a concrete walkway of approximately five feet in length, running above the lagoon bank (see Figure 3-2 and 3-3) that dead ends at a wall, house 3621 (see Figure 3-4), and then continues from the wall to a historical concrete walkway of approximately ten feet, (see Figure 3-5 and 3-6). The historical concrete sidewalk also exists from house 3511 to the wall at house 3621, however, this portion of the sidewalk is buried underneath soil that currently acts as a bank, approximately four feet high where natural estuarine vegetation grows (see Figure 3-7). Given that the historical walkway, from house 3621 to the end of Grand Canal, house 3815, is below the high tide level, several times during the year this walkway submerged (see Figure 3-8). Since this sidewalk does not connect to any destination, it is rarely used, although officially designated as public access.

Figure 3-2
Walkway along east bank

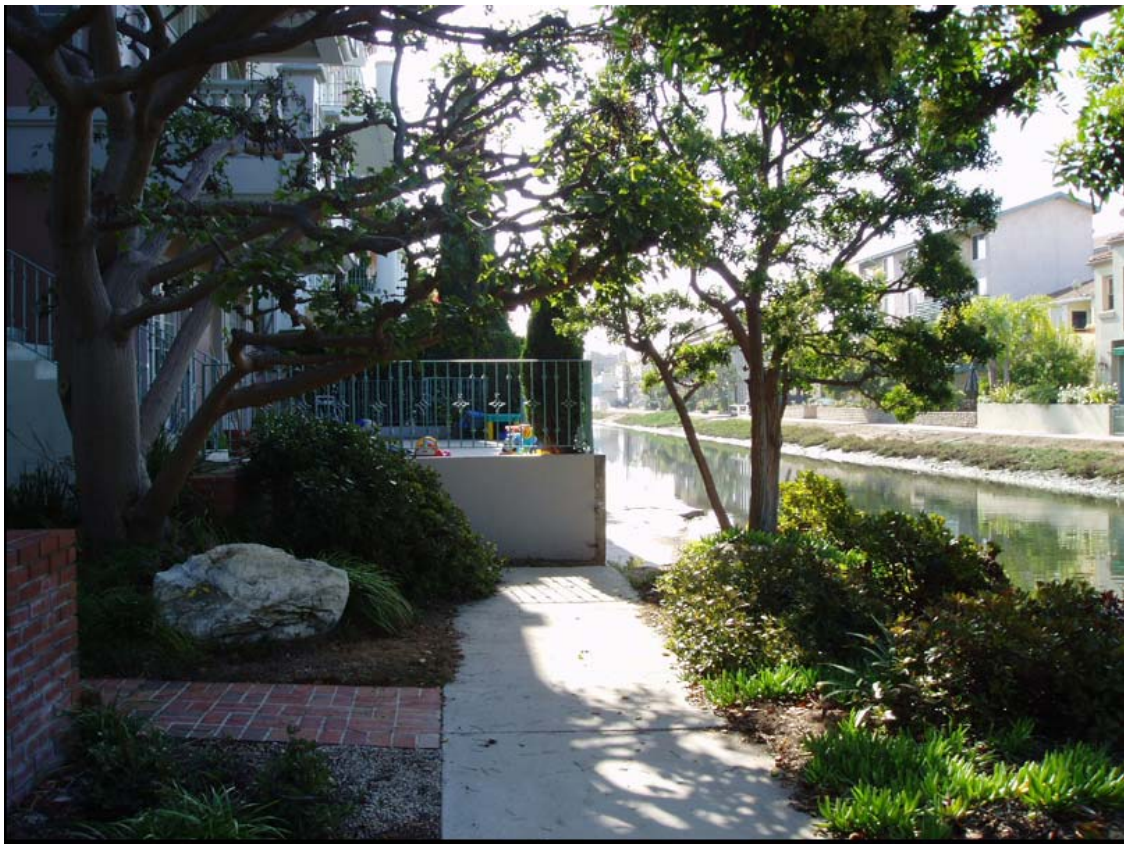


Figure 3-3
Section of the walkway along the east bank

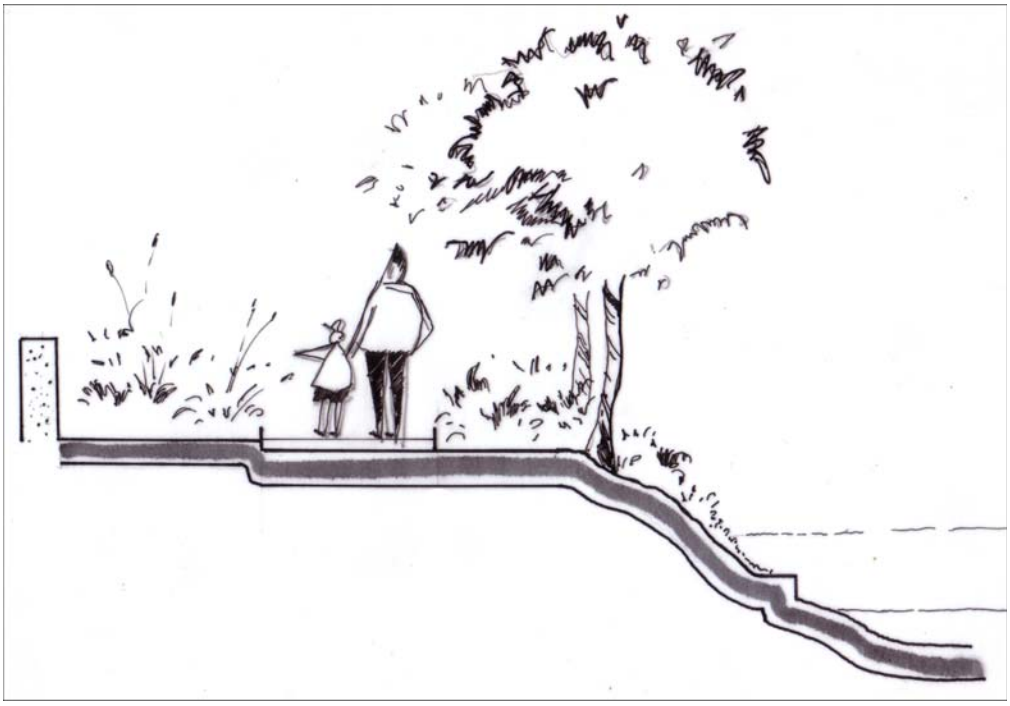


Figure 3-4
Walkway dead ends on east bank

Figure 3-5
Historical walkway along east bank

Figure 3-6
Section of the historical walkway along the east bank

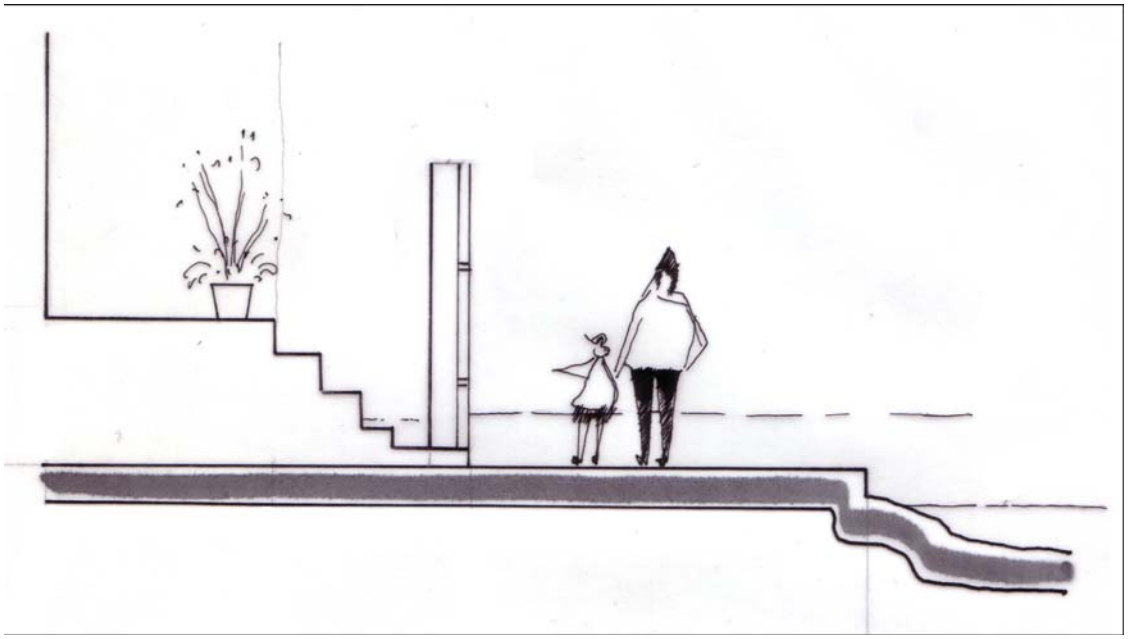


Figure 3-7
Vegetation along historical walk

Figure 3-8
High tide level shown on wall along historical walkway

3.2.2.2 West Bank

The west bank of Grand Canal from Washington Boulevard to Driftwood Street, running along Strongs Drive, does not have an official walking path, therefore, pedestrians walk

on the upper edge of the lagoon bank, trampling over vegetation and eroding the upper edge of the bank (see Figures 3-9 and 3-10). A concrete walkway starting from Driftwood Street and Strongs Drive runs along the entire west side of Grand Canal on the upper edges of the bank. This walkway ends at the Venice pumping plant at the beginning of Ballona Lagoon Marine Preserve (see Figure 3-11).

Figure 3-9
Undefined pedestrian path along Strong Drive

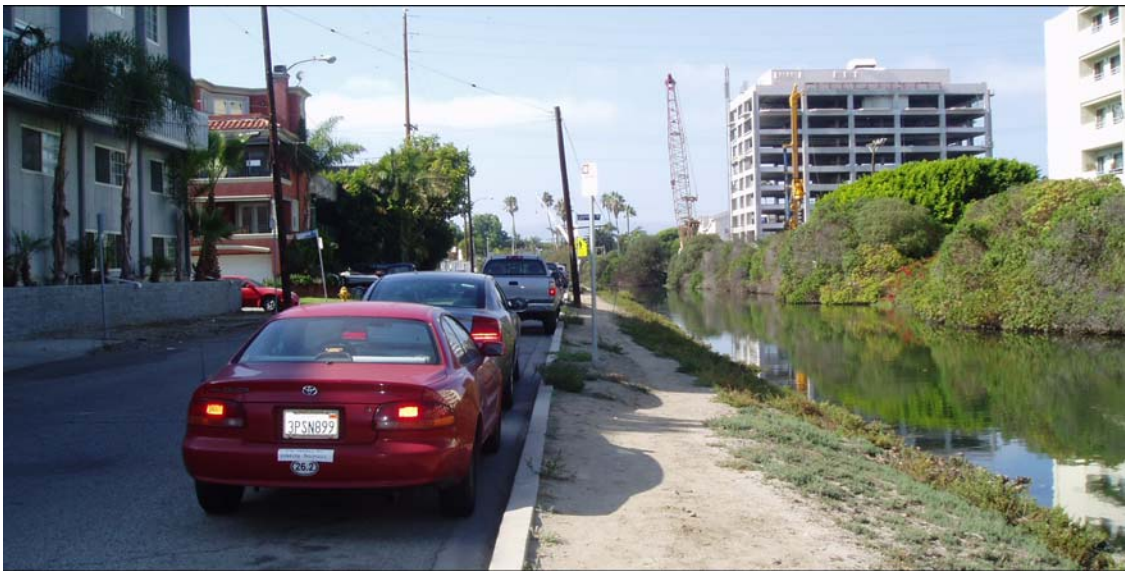


Figure 3-10
Section of Strongs Drive

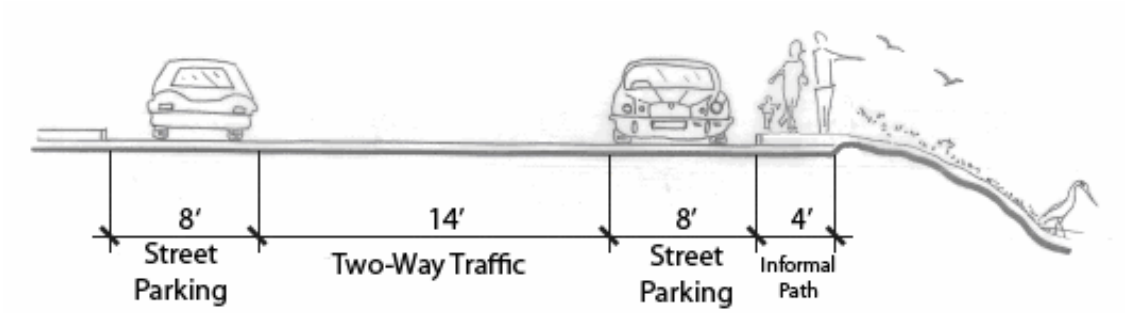


Figure 3-11
Concrete walkway along west bank

3.2.3 Vehicular Circulation

3.2.3.1 Washington Boulevard

Washington Boulevard, a major commercial street located north of Grand Canal serves as a major arterial street connecting communities from east to west, including Culver City, Mar Vista, and Palms (see Figure 3-12). Washington Boulevard ends at a county parking lot at Venice Beach. During weekly rush hour and weekends, this major street becomes difficult to navigate. Traffic congestion spots accumulate in major intersections such as Pacific Avenue (see Figure 3-13), to the west, and Lincoln Boulevard to the east, causing what should be a typical ten-minute vehicular ride from Lincoln Boulevard to the beach to sometimes take as long as twenty-five minutes. Washington Boulevard also serves as a major public transportation route. There is no formal crosswalk linking Grand Canal with the adjacent Venice Canals. Washington Boulevard currently serves as the main public entrance point to Grand Canal (see Figure 3-14).

Figure 3-12
Existing vehicular circulation

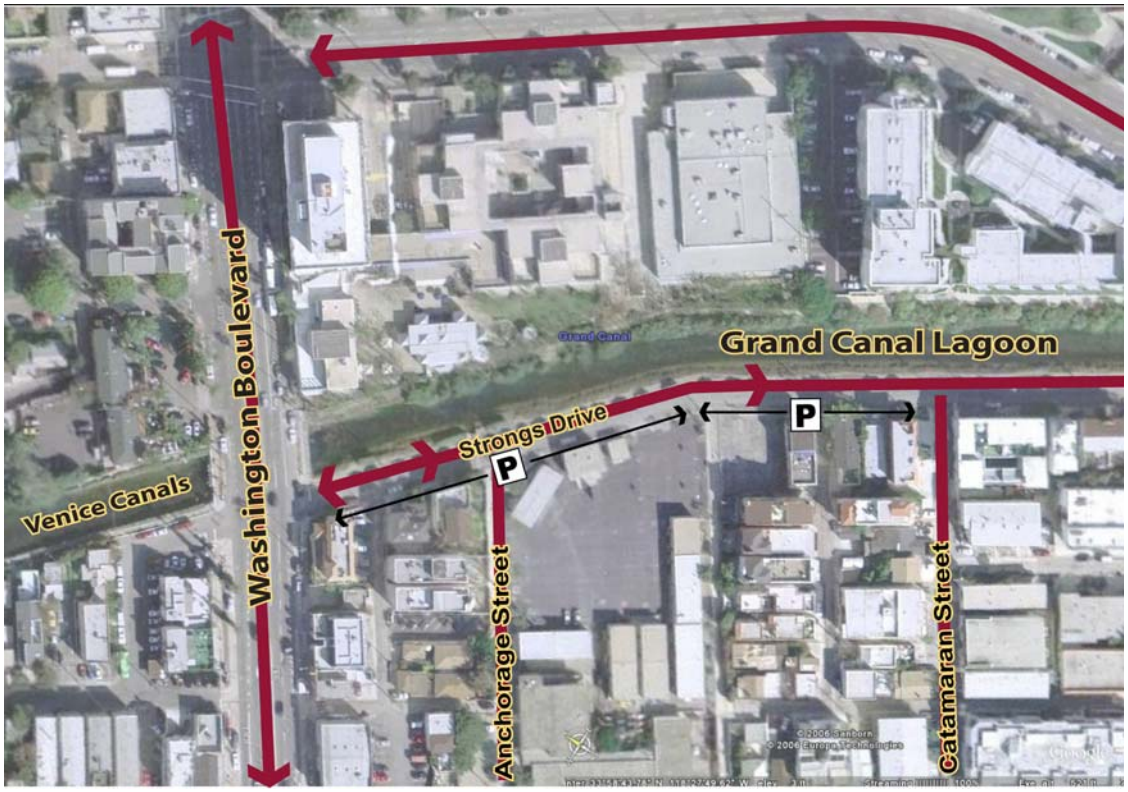


Figure 3-13
Traffic congestion along Washington Blvd.

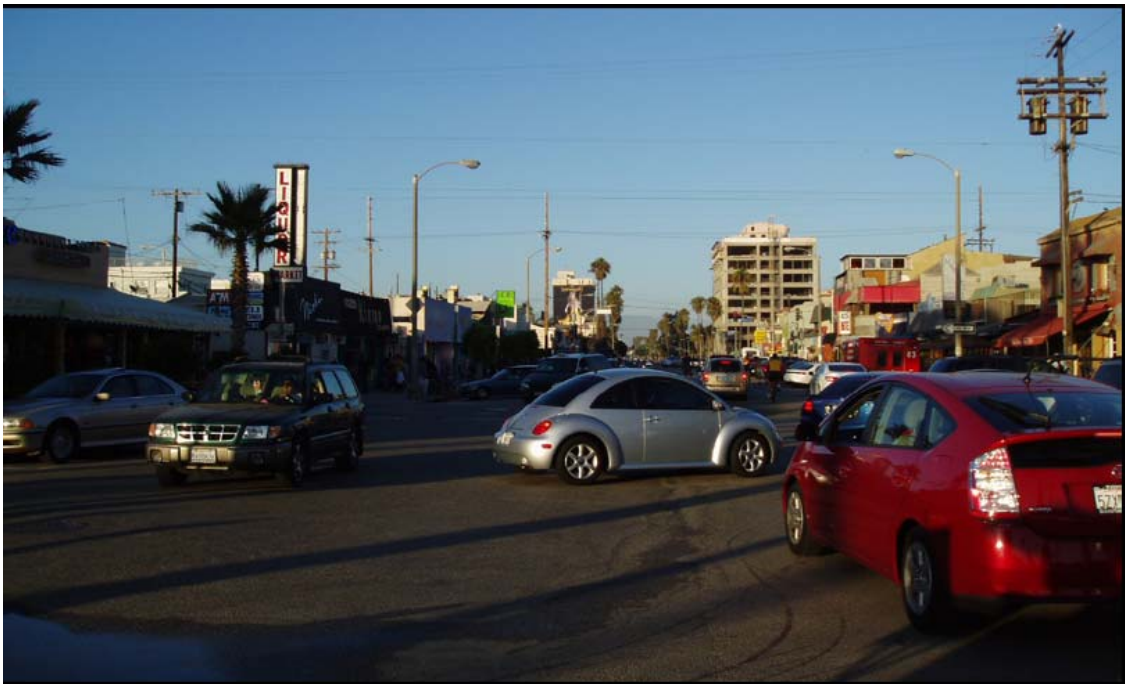


Figure 3-14
Entrance to Grand Canal along Washington Blvd.

3.2.3.2 Strongs Drive

Strongs Drive, a residential street between Washington Boulevard and Driftwood Street, is a thirty-foot, two-way street with parking on both sides (see Figure 3-15). On the west side of the street, there are twelve non-metered parking spaces, seven 15-minute spaces and two that allow parking from 5pm to 7am. On the east side of the street, adjacent to the canal, there are six metered parking spaces and 35 non-metered parking spaces. The amount of vehicular and pedestrian traffic circulation on the narrow street may pose a safety concern for both pedestrians and vehicular traffic. Vehicular traffic enters and exits the street either by turning from Washington Boulevard or Driftwood Street. The narrowness of the street, along with the current parking arrangement creates blind spots for drivers, impeding visibility towards the street causing concerns for potential accidents. Residents, in cooperation with the elementary school which has a playground immediately adjacent to Strongs, have made attempts to create one-way vehicular traffic along Strongs Drive to increase safety in this area. Additionally, Section 59.09.02-Fire Department Access of the Los Angeles Fire Code Division 9 states that: “fire lanes shall have a minimum clear roadway width of 20 feet when no parking is allowed on either side,” and “where parallel parking is allowed on either side of a fire lane, the roadway width shall be increased eight feet for each parking lane. (Amended by Ord. No. 167,326, Eff. 11/16/91.).” Under current conditions, Strongs drive does not comply with this code.

Figure 3-15
Street parking along Strongs Drive

3.2.3.3 Via Dolce

Via Dolce, a major residential street between Washington Boulevard and the Marina Harbor is a sixty-foot two-way four-lane street with parking and sidewalks on both sides, located east of Grand Canal (see Figures 3-16 and 3-17). Despite the wideness of Via Dolce and the extensive number of parking spaces (approximately sixty-six on the east side and forty-one on the west side (between Washington Boulevard and Marquesas Way)), very little foot and vehicular traffic travels this street As a result, the few vehicles that utilize the street seem to travel at very high speeds. The overall pedestrian qualities of this street are positive given the existing mix of modern and traditional architecture located on the edges of the sidewalks and the fact that the street provides an easy entry point to Ballona Lagoon Marine Preserve (see Figures 3-18 and 3-19).

Figure 3-16
Via Dolce looking north

Figure 3-17
Via Dolce looking north

Figure 3-18
Walkway along Via Dolce

Figure 3-19
Via Dolce adjacent to Ballona Lagoon Marine Preserve

3.2.4 Public Transportation

An extensive transit system serving the area of Grand Canal currently operates weekly and on the weekends. The Southern California Rapid Transit District serves the City of Los Angeles and its outskirts. The Santa Monica Big Blue Bus and Culver City bus lines, serve their respective cities and link to all major centers of activity, including the areas in

and around Grand Canal Lagoon. In addition, Playa Vista and the County of Los Angeles currently operate a free shuttle service that circulates from Lincoln and Jefferson Boulevards (Playa Vista development) to Marina del Rey, through Admiralty Way, Washington Boulevard, Via Dolce and Pacific Avenue, all streets that run along and around Grand Canal. The Playa Vista shuttle runs during the heavy summer traffic time from July 1 to September 4.

3.2.5 County Parking Lots

Two major county parking lots (one of which is underutilized, either due to inadequate "welcoming" signage, parking fees or other unknown reasons) are located walking distance to and from Grand Canal. These lots allow for significant parking accommodations, in addition to parking spaces on Strongs Drive, Via Dolce and seven smaller residential streets (Anchorage, Catamaran, Driftwood, Eastwind, Fleet, Galleon and Hurricane Street). Of the two county parking lots, one is located at the end of Washington Boulevard and the beach, three blocks away from Grand Canal. The other parking lot is located on Admiralty and Palawan Way, in front of Mother's Beach, (see Figures 3-20 through 3-22) a major attraction point for residents and visitors (see Figure 3-23). This lot is six blocks away from Grand Canal and is underutilized. Los Angeles County Services Chief Dusty Crane explains, in an interview with the Daily Breeze, published on October 3, 2007, that marina parking lots are empty most of the time. Their proximity to Grand Canal and the beach provide a significant opportunity for parking without interfering with biological restoration. All that is needed is appropriate directional signage and other effective communication with the automobile-using public.

Figure 3-20
County parking lot

Figure 3-21
View from County parking lot

Figure 3-22
County parking lot

Marina del Rey
Public Parking Lot 10
Autos Only (no trailers)
Parking over 48 hours must register by calling (310) 305-9534.
No overnight camping or sleeping.
Recreational vehicles prohibited
2:00 a.m. – 6:00 a.m. (LACC – 19.12.1330)
County of Los Angeles

Figure 3-23
Regional Landmarks and Recreation

3.2.6 Urban and Natural Zones

Given its strategic location adjacent to the Marina del Rey Harbor, the Venice Canals, the Ballona Lagoon Marine Preserve, the Ballona Wetlands Ecological Reserve and most importantly to the Southern California coast, Grand Canal is a transitional landscape, nestled between commercial, retail and recreational activity.

Grand Canal can be divided into two distinct zones, the urban and natural zone. The urban zone, running from Washington Boulevard to Driftwood Street, is characterized by high-density residential and commercial areas. Vertical and horizontal structures define the urban landscape. Higher pedestrian and vehicular activity occurs this zone given its proximity to Washington Boulevard and the existing elementary school. The natural zone, running from Driftwood to the end of Grand Canal, characterized by low-density single-family residential housing. The homes in this zone are located closer to the lagoon, forming an enclosed and quieter space, fewer pedestrians access this zone and very little vehicular traffic utilizes the adjacent streets. A larger variety of birds gather at the edges of the banks in this area, possibly due to less pedestrian and vehicular traffic, and to its proximity to Ballona Marine Preserve (see Figure 3-24).

Figure 3-24
Urban and natural zones

3.2.7 Summary

In summary, the following issues were identified:

- Lack of disability access
- Lack of pedestrian connection between east and west side of Canal
- Lack of park space defining entrance to Grand Canal
- Lack of demonstration areas for interpretive learning
- Lack of gathering areas

- Lack of recreation amenities and signage
- Lack of connections to landmarks within the regional scale

3.3 Biological Resources

Biological resources were analyzed in terms of the presence of specific native and non-native biological species. A wetlands delineation was also performed. A total of 15 native plant species were observed; Pickleweed dominated the salt marsh vegetation. Some wetlands plants were observed in the east-side trail as it is sometimes below the tidal water level. Observed special status species include Wooly Sea-Blite, Brackish-water Snail, Snowy Egret, and Great Egret. Special interest species include, for example, Fiddler Crab and California Sea Lavender. Existing conditions of the various study areas include degraded upper banks, some of which have been trampled, and some are covered with exotic plants; erosion from stormwater flows; debris scattered on the canal bottom; and weedy undeveloped parcels.

3.3.1 Terrestrial Biota - Botanical Resources

As a result of the one-day survey of the Grand Canal study areas, a total of 15 native plant species was observed (Appendix 7.4 of Appendix C), most of which are wetland plants found along the intertidal banks of the canal. Most of the species are characteristic of coastal wetlands and the overall dominant plant was Pickleweed (Sarcocornia pacifica), which occurs along the lower banks of the canal with other salt marsh species. The upland flora is characterized by almost entirely introduced exotic species due to the degraded nature of the habitats and the ongoing disturbances.

Of interest, however, is the occurrence of California Sea Lavender (Limonium californicum; Figure 3-25), which occurs as scattered individuals in the salt marsh vegetation of several study areas. This relatively common species is relatively unknown from the Ballona Wetland Ecosystem except for its recent discovery at Grand Canal, and on the east bank of the Ballona Lagoon.

Also of interest is the occurrence of several plants of Wooly Seablite (Suaeda taxifolia; Photo 5), one each in Study Areas W-9, E-1, and E-2. This plant is listed by the California Native Plant Society as a List 3 species of special concern due to its restricted occurrence along coastal bluffs and margin of estuaries, both habitats of which are impacts by urbanization of the coast. This species also occurs elsewhere within the Ballona Wetland Ecosystem. Another species of increasingly limited occurrence is Spiny Rush (Juncus acutus), which was observed at Grand Canal as a single plant (Study Area E-5). This species was included in the plant palette of the Ballona Lagoon restoration project immediately south of the Grand Canal (e.g., Figure 3-26). It is likely that a seed from the introduced plants was carried by incoming tidewater where it germinated and has persisted in the degraded intertidal concrete walkway.

Figure 3-25
California Sea Lavender (*Limonium californicum*)

Figure 3-26
Wooly Sea-Blite (*Suaeda taxifolia*)

Figure 3-27
Ballona Lagoon Marine Preserve

3.3.2 Terrestrial Biota – Zoological Resources

As a result of the one-day study by Psomas (2007b; Appendix 7.6 of Appendix C) and Maser Consulting P. A. as reported herein, and tour with the Grand Canal Advisory Committee, few terrestrial animals were observed along the Grand Canal corridor. A total of ten bird species were observed during the 2007 survey (Table 1, Psomas 2007b). Psomas does cite and include in their report monthly observations for the adjacent Ballona Lagoon by Chuck and Lillian Almdale for the period 1996 – 2004 as summarized by MBC in 2005. MBC reports 2,298 bird observances including 18,899 sightings of 94 different species, many of which may utilize the resources of Grand Canal on an occasional basis. Therefore, the opportunities for actual or potential use of Grand Canal are apparently greater than revealed during the one-day observations by Psomas and Maser Consulting P. A. in July 2007. Psomas (2007b) reports that no mammals, amphibians, or reptiles were observed during the field survey. Psomas explains that, "Many wildlife species are secretive and nocturnal…and therefore assessments of presence/absence were based upon habitat, diagnostic features…, known records, or occurrence within the areas, known range, and habitat utilization from the relevant literature."

Regarding terrestrial invertebrates, only one butterfly (a Rusty Skipper nectaring on Seaside Heliotrope) was observed throughout the Grand Canal study areas and only one other insect, a dragon fly was observed along the canal in Study Area E-1. We anticipate the lack of terrestrial insects is likely due to the lack of native host plants for foraging by larval stages and for nectaring by adult stages, especially in the upland habitats, as well as

for the subsequent lack of prey for predatory species. Enhancement and restoration alternatives proposed herein are designed in part to improve the richness and densities of the depauperate terrestrial invertebrate fauna.

3.3.3 Aquatic Biota

The marine biota was sampled by MBC during the one-day field evaluation of Grand Canal and the results of their work are reported in MBC (2007) and provided in Appendix 7.7 of Appendix C. They found that California Horn Snail (Cerithidea californica; Figure 3-27) dominated the intertidal and subtidal muddy bottoms. California Jackknife Clam (Tagelus californianus) shells were the only other macroinvertebrates in their sample quadrants. The bivalve species likely live in burrows deeper that the samples gathered. Mussel shells, probably the Blue Bay Mussel (Mytilus galloprovencialis), were observed throughout the canal as were shells of other common bivalve species. Three live Asian Mussels (Musclista senhousia) also were collected, which is a common introduced species. Crabs including shore crabs (Pachygrapsus or Hemigrapsus) and Fiddler Crabs (Uca crenulata) were located at only a few sites along Grand Canal, as noted below in the study area descriptions. The invertebrate infaunal assemblage was dominated by small crustaceans, mostly amphipods, and worms, as expected. At two sample locations, seven shells of the California Brackish-water Snail (Tryonia imitator), a CNDDB-listed sensitive species, were found. This is the first record of this species from the Grand Canal. Although only empty shells were recovered in shallow subtidal water, the presence of Brackish-water Snail shells is a “strong indicator” the species currently resides in Grand Canal (MBC 2007).

The fish fauna also was sampled by MBC during the July 26, 2007 field survey (MBC 2007; Figure 3-28). Top Smelt (Atherinops affinis) dominated the fish fauna with large schools containing more than 50 individuals migrating up and down the channel, nearly all of which were young-of-the-year individuals (MBC 2007; Appendix 7.7 of Appendix C). Other fish species observed or captured during the survey include gobies/sculpins (Gobiidae or Cottidae), Longjaw Mudsucker (Gillichthys mirabilis), California Killifish (Fungulus parvinipinnis), and Bay Pipefish (Syngnathus leptorhynchus). Other fish species, including California Halibut, have been observed or reported by members of the local community, but these additional species were not found during the one-day MBC study in July 2007.

Figure 3-28
California Horn Snails (*Cerithidea californica*)

Figure 3-29
Fish fauna sampled via field survey

3.3.4 Threatened, Endangered, and Special Concern Species

The California Natural Diversity Database provided a list and individual portraits of the special status species reported from the general Ballona Wetland Ecosystem, including Grand Canal (Appendix 7.8 of Appendix C). Their records include 33 taxa of plants and animals and two plant communities, among which the CNPS-listed Wooly Seablite is not included. In another inventory of species status species for the entire Ballona Wetland Ecosystem and vicinity, PWA et al. (2007) reported 76 species including 19 vascular plants, 11 invertebrates, 5 fish, 7 herpetofauna, 7 mammals, and 27 birds. Although various lists can be compiled citing a number of different sources, it is clear the Grand Canal is situated in the context of a broader ecosystem that has had in the past and in many cases still has importance for a significant number of special status species. Although some might question the value and wisdom of considering a small urbanized site such as Grand Canal for recovery of some special status species, it is clear that for other species Grand Canal provides habitat for extant populations of some listed species and could provide restored habitat for recovered populations of other sensitive species.

As noted above, Wooly Seablite (Suaeda taxifolia), a CNPS List-3 special concern plant species, currently exists as three individuals along the upper limits of the tide in three different Grand Canal study areas. Opportunities exist to provide additional habitat and

increase the numbers of individuals to a more sustainable population size than currently exists. The Brackish-water Snail (Tryonia imitator) is the only other special status species observed during the study in which empty shells were found in two different sample areas. This species has a global rarity code of G2G3 and a state rarity code of S2S3. Other species that may currently utilize the resources of Grand Canal, but were not observed during the combined Psomas, MBC, and Maser Consulting P. A. studies, include but may not be restricted to the following: Belding's Savannah Sparrow (Passerculus sandwichensis beldingi) resting and foraging on salt marsh vegetation; California Brown Pelican (Pelecanus occidentalis californicus) resting and foraging in the canal; and Wandering Skipper (Panoquina errans) foraging on Salt Grass and perhaps reproducing along the canal.

In the MBC Report checklist of birds (1996 – 2005) included in the Psomas report, several special status birds were reported for the Ballona Lagoon located immediately south of the Grand Canal, including the following: Western Grebe (Aechmophorus occidentalis), state rank S?); Double Crested Cormorant (Palacrocorax auritus), state rank S3; California Brown Pelican (Pelecanus occidentalis californicus), FE, SE; Great Blue Heron (Ardea Herodias), state rank S4; Great Egret (Ardea alba), state rank S4; Snowy Egret (Egretta thula), state rank S4; Black-crowned Night Heron (Nycticorax nycticorax), state rank S3; Buffelhead (Bucephala albeola), state rank S?; California Gull (Larus californicus), state rank S2); Caspian Tern (Sterna caspia), state rank S4; Foster's Tern (Sterna forsteri), state rank S4); California Least Tern (Sterna antillarum browni), FE SE; Black Skipper (Rynchops niger), state rank S1,S3; Rufous Hummingbird (Selasphorus rufus), state rank S1,S2; and Loggerhead Shrike (Lanius ludovicianus), state rank S4. Of these special status birds, one Snowy Egret and one Great Egret were observed foraging along Grand Canal during the Psomas, MBC, and Maser studies reported herein. Other species listed for the Ballona Lagoon are potential for Grand Canal, particularly the endangered California Brown Pelican.

3.3.5 Wetland Delineation and Permitting

The wetland delineation was conducted by staff from Psomas during the one-day field study of Grand Canal. The methods and results are reported in PSOMAS (2007), included herein in Appendix 7.6, and reproduced for each of the 16 study areas on Figs. 1 – 11. The wetland delineation was two-part: (1) a delineation relative to the criteria for Federal jurisdictional wetlands as mandated under the Clean Water Act and administered by the U.S. Army Corps of Engineers; and (2) a delineation relative to criteria applied by the California Department of Fish and Game and the California Coastal Commission. In all cases along the canal, the Federal jurisdictional boundary between uplands and wetlands occurs lower on the banks of the canal than does the state boundary, resulting in more wetlands under State jurisdiction than wetlands under Federal jurisdiction. Cover amounts for the wetlands are provided in a table in Appendix 7.1 of Appendix C. As present in this table, total CDFG wetland cover is the sum of the ACOE wetland cover (which occurs lower on the bank slopes) and the CDFG wetland cover (which occurs higher on the bank slopes) for each study area.

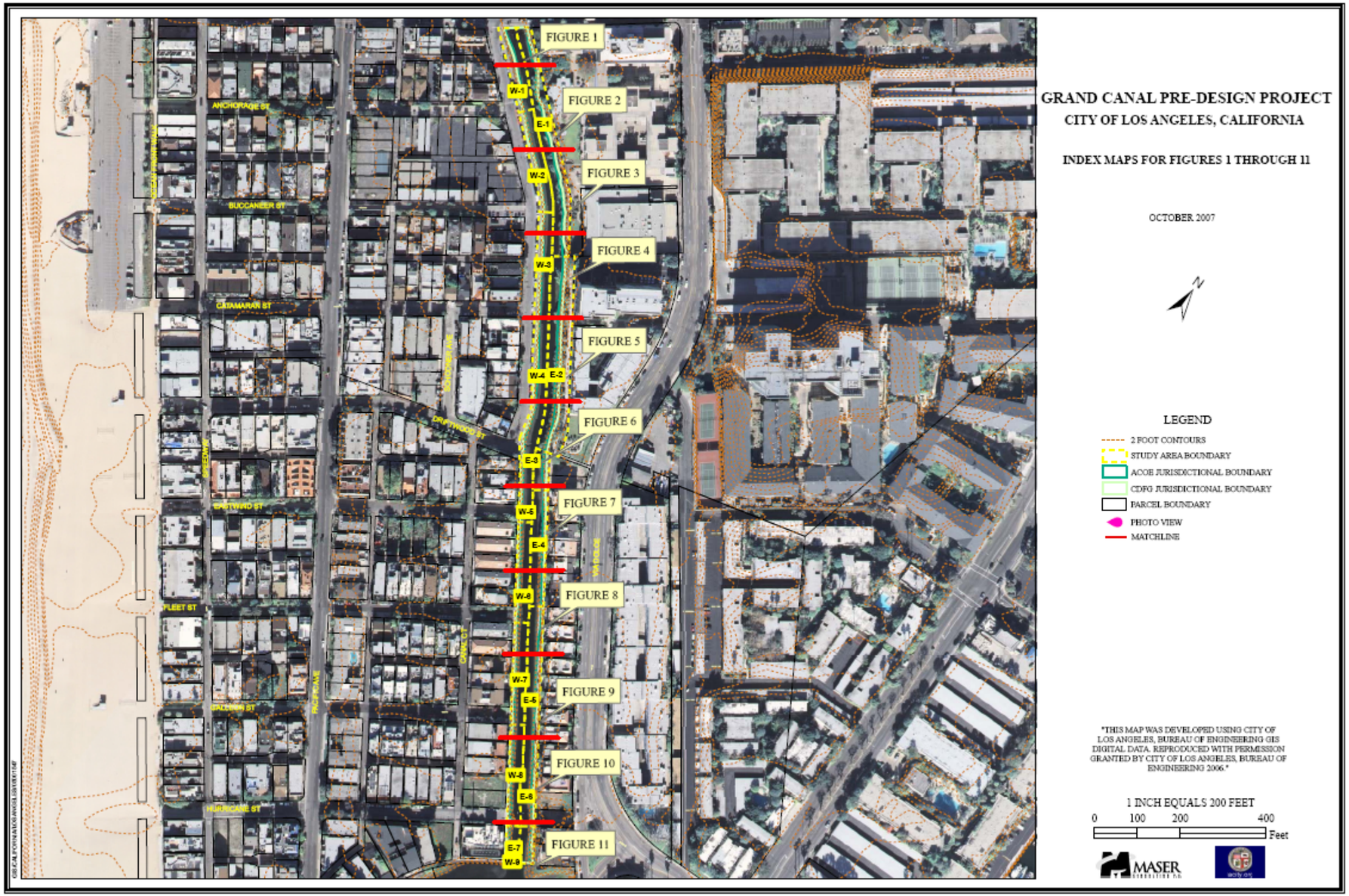
As noted in PSOMAS (2007), "Because the project is located within the jurisdiction of the USACOE, CDFG, and CCC, the project [i.e. restoration project] will require permits from each of these agencies in compliance with the federal Clean water Act, Section 404, and the State Fish and Game Code, Section 1603, and the Coastal Zone Management Act. The project is most likely not subject to an exemption under the California Environmental Quality Act (CEQA) as defined in Article 19. Therefore an initial study to determine the proper CEQA document would be appropriate."

3.3.6 Study Areas – West Grand Canal

Nine study areas were defined along the west side of the Grand Canal, which were bounded on the east by the center of the canal; on the west by the outer margin of public access walks and paths; and to the north and south of each study area by roads or the terminus of the Grand Canal.

Please refer to Figure 3-30 on the following page, which shows an index map showing an aerial view of the boundaries of the study areas. The figures referred to in the map can be found in Appendix 7.1 of Appendix C.

Figure 3-30
Index Map: Aerial View of Study Area Boundaries



They total 1.457 ac of upland, wetland, and open water habitat not including the concrete walk that forms the Esplanade or the ends of roads. The west-side areas include 0.534 ac of total wetland cover (i.e., CDFG wetlands plus ACOE wetlands). In all cases, the terminus of a road perpendicular to the axis of the canal was considered in the study area to the north of the road forming the boundary (Figs. 1 – 11, Appendix 7.1 of Appendix C). Photographs for each study area are illustrated on Figs. 1 – 11, or are included among those provided in Appendix 7.2 of Appendix C. Information for each study area is contained on a corresponding datasheet in Appendix 7.3 of Appendix C in the PSOMAS (2007, Appendix 7.6 of Appendix C) and MBC (2007, Appendix 7.7 of Appendix C) reports.

3.3.6.1 Study Area W-1

This area covers 0.177 ac including 0.038 ac of total (i.e., CDFG) wetland, 0.069 ac of upland, and 0.070 ac of open water habitat and extends along Strongs Drive from Washington Blvd. south to and including Anchorage St. It includes subtidal canal habitat, intertidal wetland characterized by salt marsh vegetation on the lower bank, and disturbed upland habitat on the bank and top of bank habitat. Salinity measure in the canal was 32 ‰, which is nearly the salinity of sea water indicating little dilution occurred at the time from precipitation or various urban sources. Trimmed shrubs of Quail Bush (*Atriplex lentiformis*), a native plant of coastal bluffs and margins of estuaries, may have been planted along the bank, apparently similar to those seen along the Venice canals. A relatively large stand of Salt Grass (*Distichlis spicata*) occurs in wetland and extends into upland habitat and may be appropriate for use by the Wandering or Salt Marsh Skipper, a special status butterfly the caterpillar of which eats only Salt Grass. Other plants of interest include Annual Sea-Blite, (*Suaeda calceoliformis*) which was observed nowhere else along the canal except in W-1; and California Sea Lavender (*Limonium californicum*), which occurs in several study areas along Grand Canal but is not currently known from elsewhere in the Ballona Wetland Ecosystem. MBC (2007) reports Shore Crabs (*Pachygrapsus or Hemigrapsus*) from the area. Disturbances include loss of vegetation and soil compaction on the top of and upper bank due to an informal public access trail; accumulation of dog excrement; and erosion from stormwater flows.

3.3.6.2 Study Area W-2

This area covers 0.184 ac, including 0.070 ac of total (i.e., CDFG) wetland, 0.049 ac of upland, and 0.065 ac of open water habitat, and extends from along Strongs Drive Anchorage St. south to and including Buccaneer St. It is similar to W-1 in vegetation and disturbance. MBC (2007) reports Brackish-Water Snail shells, a special status species, from the canal in this area.

3.3.6.3 Study Area W-3

This area covers 0.189 ac including 0.063 ac of total wetland, 0.053 ac of upland, and 0.073 ac of open water habitat, and extends along Strongs Drive from Buccaneer St. south to and including Catamaran St. It is similar to W-1 and W-2 in vegetation and disturbance. MBC (2007) reports Brackish-Water Snail shells, a special status species, from the canal in this area.

3.3.6.4 Study Area W-4

This area covers 0.275 ac including 0.097 ac of total wetland, 0.056 ac of upland, and 0.122 ac of open water habitat, and extends from Catamaran St. south to and including Driftwood St. It is similar to W-1, W-2, and W-3 in vegetation and disturbance. Salinities measured 32 ‰ during a morning test and 22 ‰ during an afternoon test in the vicinity of outflow from a stormwater pipe that was receiving urban runoff due to watering of lawns or from washing of cars. As with C-1, the salt marsh vegetation of this area included California Sea Lavender. A small population of Fiddler Crab (Uca crenulata) was observed (active burrows) on a bench in the vicinity of the terminus of Driftwood St. Significant erosion of the bank has resulted from stormwater runoff from a pipe and from direct flow off the intersection of Strongs Drive and Driftwood St. As with other study areas along Strongs Drive, there is an accumulation of dog excrement.

3.3.6.5 Study Area W-5

This area covers 0.103 ac including 0.043 ac of total wetland, 0.010 ac of upland, and 0.050 ac of open water habitat, and extends along the Esplanade from Driftwood to and including Eastwind St. It is one of the most disturbed areas along the western side of Grand Canal (virtually no wetland or upland vegetation exists) largely due to excessive use by ducks resulting from intentional feeding by a local resident.

3.3.6.6 Study Area W-6

This area covers 0.170 ac including 0.063 ac of total wetland, 0.016 ac of upland, and 0.091 ac of open water habitat, and extends south along Esplanade from Eastwind St. to Fleet St. Salinity in the canal measured 32 ‰. California Sea Lavender was observed in the salt marsh vegetation and a Rusty Skipper, the only butterfly observed during the one-day study was seen nectaring on a small colony of the native plant Seaside Heliotrope (Heliotropium curassavicum).

3.3.6.7 Study Area W-7

This area covers 0.174 ac including 0.065 ac of total wetland, 0.014 ac of upland, and 0.095 ac of open water habitat, and extends south along Esplanade from Fleet St. to Galleon St.There is no curb at the end of Galleon and hence water flows from the asphalt

street down the bank causing erosion. Salinity was measured at 30 ‰, lower than most other areas apparently due to recent activities of local residents, possibly from car washing. Various invasive exotic plants, apparently expanded from plantings, dominate portions of the upper bank. Salt marsh vegetation characterizes the lower intertidal bank as it does elsewhere along this part of the canal. Live mussels were observed attached to rocks in the canal at the end Galleon.

3.3.6.8 Study Area W-8

This area covers 0.166 ac including 0.068 ac of total wetland, 0.006 ac of upland, and 0.092 ac of open water habitat, and extends south along Esplanade from Galleon St. to Hurricane St.Conditions are similar to area W-7 regarding salt marsh vegetation, invasive plant species, and erosion at the end of Hurricane due to stormwater runoff. A mulberry tree overhangs the bank and due to shading has prevented the growth of vegetation. Rubble in the canal and on banks is apparently left over from an old pedestrian bridge that once crossed the canal. Scattered mussels and oysters were observed on the rubble in the canal. Dog excrement was common in the area. An undeveloped city-owned parcel (including two lots that cover 0.08 and 0.09 ac totaling 0.17 ac) is located at the end of Hurricane and provides opportunities to create a pocket park and stormwater treatment wetland or rain garden.

3.3.6.9 Study Area W-9

This area covers 0.059 ac including 0.027 ac of total wetland and wetland fill, 0.002 ac of upland, and 0.030 ac of open water habitat, and extends from Hurricane St. south along the canal to the Ballona Lagoon. A concrete walk way continues along the western side of the canal, where it joins an informal trail connects to the west side of the Lagoon. The Venice Pump Station is located adjacent to the concrete walk. Special interest species include Wooly Sea-Blite (Suaeda taxifolia), the only occurrence along the west side of the canal, and a small colony of Fiddler Crabs (Uca crenulata), as reported by MBC (2007, Appendix 7.7 of Appendix C).

3.3.7 Study Areas – East Grand Canal

Seven study areas were defined along the east side of the Grand Canal, which were bounded on the west by the center of the canal; on the east by the outer margin of public access walks or informal trails; and to the north and south of each study area by property and land use boundaries or the terminus of the Grand Canal (Figs. 1 – 11, Appendix 7.1 of Appendix C). The area covers 1.815 ac of upland, wetland, and open water habitat. Total wetland cover is 0.608 ac including CDFG and ACOE wetlands. Photographs for each study area are illustrated on Figs. 1 – 11, or are included among those provided in Appendix 7.2 of Appendix C. Information for each study area or for the general area is contained on a corresponding datasheet in Appendix 7.3 of Appendix C, and in the PSOMAS (2007) and MBC (2007) reports.

3.3.7.1 Study Area E-1

This area covers 0.466 ac including 0.136 of total wetland, 0.157 ac of upland, and 0.173 ac of open water habitat, and extends from Washington Blvd. south along the Lennar development project to the property of the County residential facility. The bank is characterized largely by a row of planted Myoporum laetum and other exotic species; however there are several patches of salt marsh vegetation scattered along the lower intertidal bank, including an occurrence of Wooly Sea-Blite (Suaeda taxifolia). An informal trail connected to a concrete walk provides public access from Washington Blvd. south along the canal to the County property. Several homeless encampments, perhaps abandoned, were observed in the row of Myoporum.

3.3.7.2 Study Area E-2

This area covers 0.584 ac including 0.145 ac of wetland, 0.269 ac of upland, and 0.170 ac of open water habitat, and extends from the Lennar property boundary south along the canal to the undeveloped City-owned parcel. Similar to area E-1, the banks are dominated by Myoporum and other exotic species and include extensive horticultural plantings maintained by residents of the facility. There are patches of salt marsh vegetation scattered along the lower intertidal bank, including an occurrence of Wooly Sea-Blite.

3.3.7.3 Study Area E-3

This area covers 0.076 ac including 0.034 ac of total wetland, 0.011 ac of upland, and 0.031 ac of open water habitat, and extends south along the canal from the County property to the first of several single family homes. A relatively large stormwater pipe (with a concrete headwall) daylights at the canal between the County and City parcels. The undeveloped City parcel extends eastward beyond the study area to Via Dolce, which provides a route for public access. The entire parcel includes two lots each covering approximately 0.07 ac. Introduced and native weedy species colonize the disturbed soils of the site. At least one small patch of salt marsh vegetation is located along the intertidal margin of the canal, which also includes a partially buried portion of the old concrete esplanade that once occurred along the entire eastern margin.

3.3.7.4 Study Area E-4

This area covers 0.218 ac including 0.095 ac of total wetland, 0.019 ac of upland, and 0.104 ac of open water habitat, and extends from the City-owned parcel south along the canal and a group of homes to a second group of homes separated by a concrete wall. Horticultural plantings with various hardscape structures such fences, which are maintained by the adjacent residents, largely characterize the area especially south of the northernmost home, which was relatively recently constructed. A public access concrete walk extends along most of the area and the old concrete esplanade is exposed along various sites, sometimes forming the margin of the canal.

3.3.7.5 Study Area E-5

This area covers 0.337 ac including 0.143 ac of "wetland" consisting of the old concrete esplanade, which is intertidal and in some portions supports small patches of salt marsh plants; 0.027 ac of uplands (perhaps best combined with the wetland category); and 0.167 ac of open water. Access to the area is somewhat blocked by a wall that separates it from Area 4, but is open to the south through adjacent undeveloped parcels. A wall separates the homes along Area E-5 from the concrete walk.

3.3.7.6 Study Area E-6

This area covers 0.64 ac including 0.025 ac of wetland, 0.008 ac of upland, and 0.031 ac of open water habitat adjacent to two undeveloped parcels, extending south along the canal from homes and the old esplanade of Area E-5 to additional homes adjacent to the Ballona Lagoon. One of the two parcels is City-owned, covers 0.8 ac, and provides another opportunity to create a pocket park with formal public access from Via Dolce. The other undeveloped parcel is approximately the same size could be acquired for the proposed park project. Both parcels are dominated by exotic plant species, especially the iceplant Carpobrotus edulis. Old oil field pipes and debris, portions of the old concrete esplanade, as well as possible rubble from an old pedestrian bridge, are located along and in the canal.

3.3.7.7 Study Area E-7

This area covers 0.070 ac including 0.03 ac of total wetland, 0.008 ac of upland, and 0.032 ac of open water habitat, and extends from the undeveloped parcels of Area E-6 south along the canal to the Ballona Lagoon. Two homes are located adjacent to the east side of the site. Salt marsh vegetation occurs as a narrow, interrupted band along the lower intertidal bank and bench, and a small colony of Fiddler Crabs (Uca crenulata) is established on the unvegetated bench habitat. The upland habitat is dominated by the invasive iceplant Carpobrotus edulis.

3.4 Storm Water Quality/Erosion

Existing **stormwater** conditions were analyzed in terms of drainage areas, land uses and their pollutants of concern, and flows/volumes during a .75 inch and 10-year 24-hour storm event. Land uses in the watershed are mainly high density single family and multi-family with commercial and retail uses adjacent to Washington Blvd. Pollutants from these land uses are varied however, trash and bacteria are particular pollutants of concern. According to the Bureau of Engineering Drainage Map (July 2007), stormwater on the west side of the canal generally runs overland from Pacific Ave. down the streets directly into the Grand Canal. Several west-side streets also have drains, usually small, which discharge directly to the Canal. Both overflows and drain inlets to the Canal have eroded the banks. One major drain enters the Grand Canal from the east at Via Dolce at the city-owned property adjacent to the County residential facility across from Driftwood.

Runoff is not treated except for Stormceptors installed at Washington and Strongs (2400 gallon) and at Via Dolce across from Driftwood (7200 gallon). These remove oil and grease and sediment.

Existing Conditions are comprised of the watershed drainage area, land uses and pollutants of concern along with physical conditions in the watershed drainage.

3.4.1 Area of Study & Drainage Area Land Uses

The area contributing stormwater to the Grand Canal includes just over 108 acres directly to the Grand Canal (Figure 3-33) and another 112 acres from upstream within the Venice Canals area (Figures 3-31 and 3-32). This study looks at Best Management Practices within 108 acres draining directly to the Grand Canal.

Figure 3-31
Drainage Area and Street Identifications of Areas Draining to Grand Canal

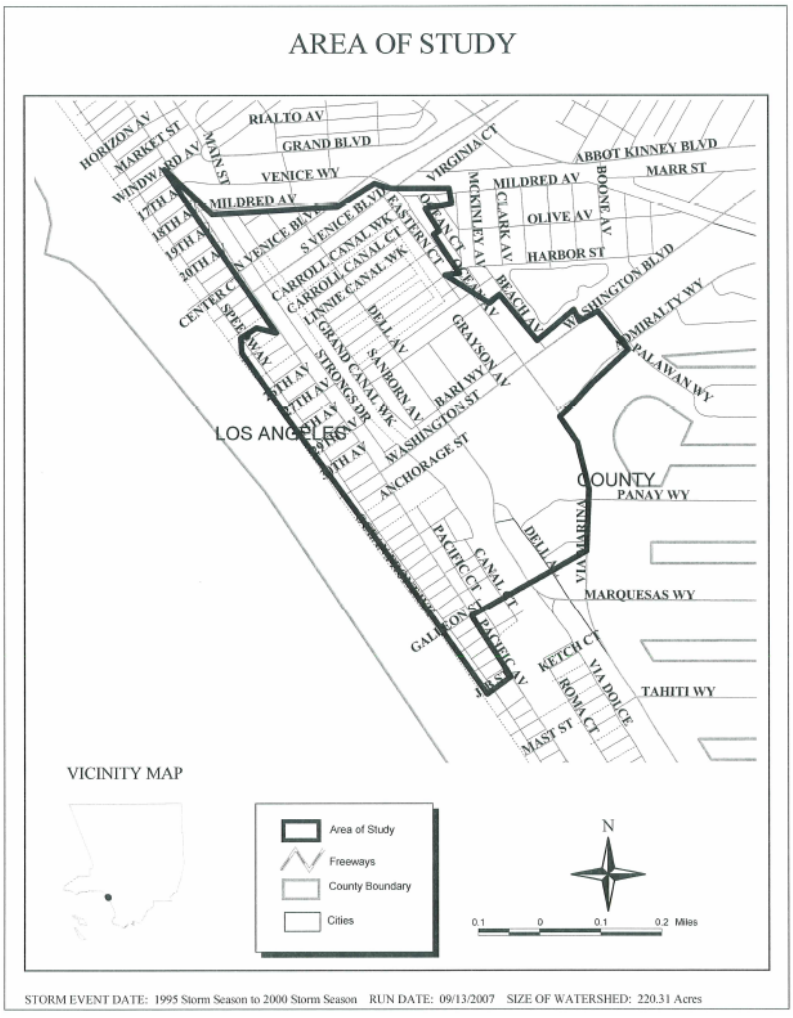


Figure 3-32
Drainage Area and Land Use Categories in Areas Draining to Grand Canal

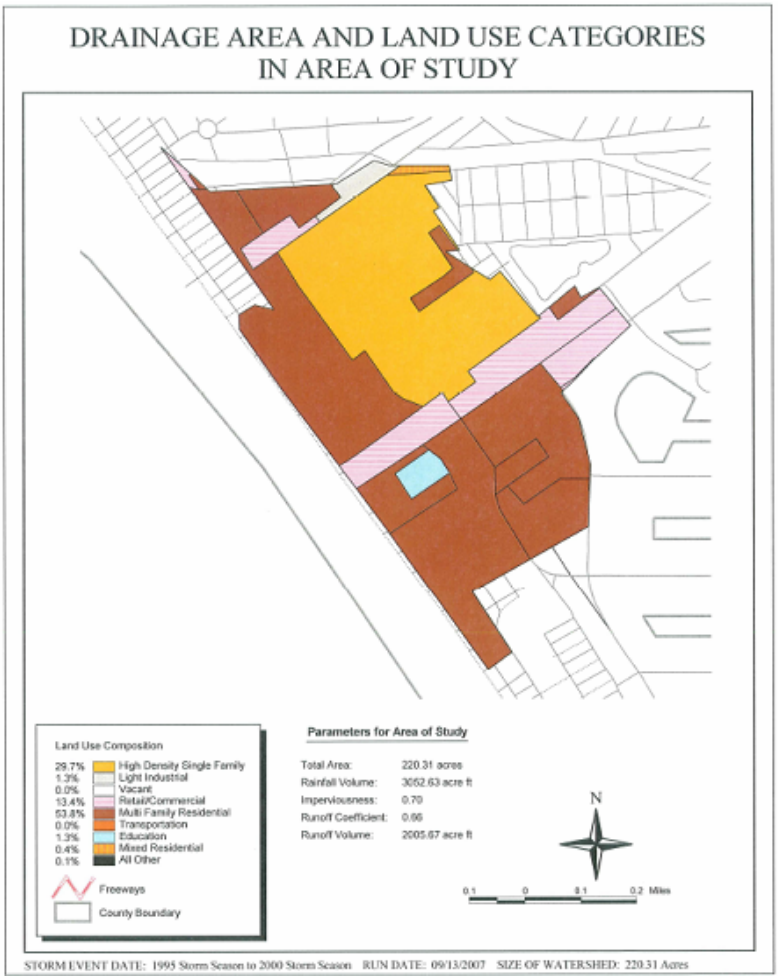
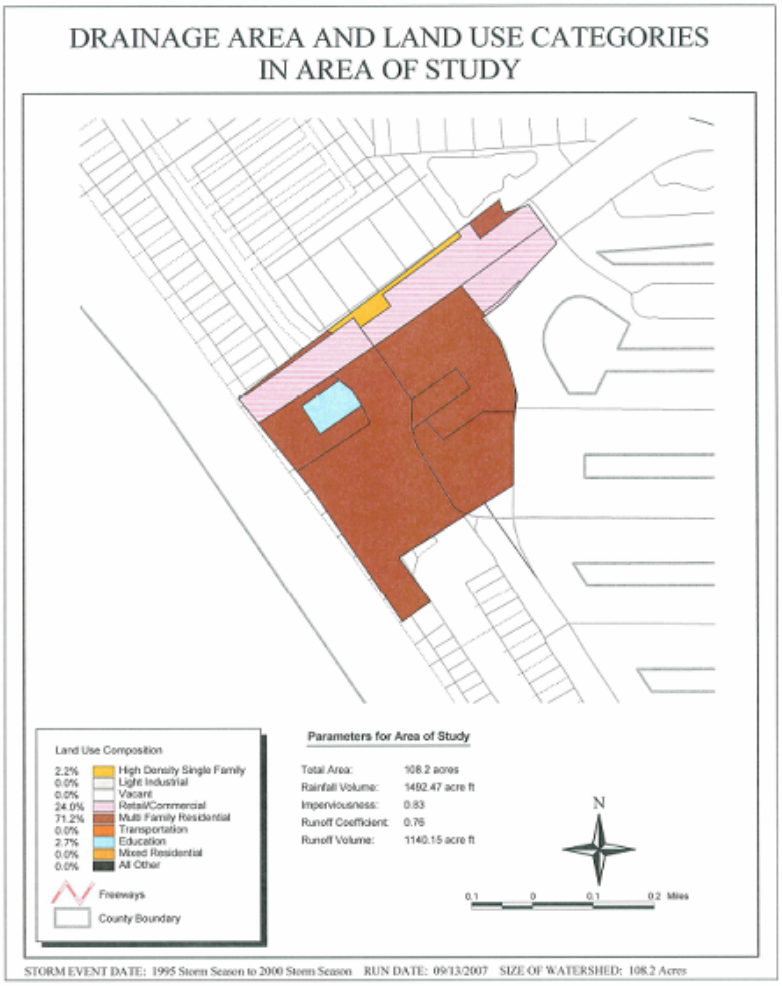


Figure 3-33
Drainage Area and Land Use Categories in Areas Draining Directly to Grand Canal


DRAINAGE AREA AND LAND USE CATEGORIES
IN AREA OF STUDY
Land Use Composition
2.2% High Density Single Family
0.0% Light Industrial
0.0% Vacant
24.0% Retail/Commercial
71.2% Multi Family Residential
0.0% Transportation
2.7% Education
0.0% Mixed Residential
0.0% All Other
Freeways
County Boundary
Parameters for Area of Study
Total Area: 108.2 acres
Rainfall Volume: 1492.47 acre ft
Impervious ness: 0.83
Runoff Coefficient: 0.76
Runoff Volume: 1140.15 acre ft
N
0.1 0 0.1 0.2 Miles
STORM EVENT DATE: 1995 Storm Season to 2000 Storm Season RUN DATE: 09/13/2007 SIZE OF WATERSHED: 108.2 Acres

3.4.2 Drainage Area

Figure 3-34, taken from a City of Los Angeles Bureau of Engineering map dated July 2007, shows the drainage area of the Grand Canal.

Figure 3-34
City of Los Angeles Drainage Map for Grand Canal Area

To calculate drainage to specific discharge points into Grand Canal, the drainage map above was segmented into more detailed sub-drainage areas as listed below. The acreage of each of these sub-drainage areas was then calculated and the volume and flows were calculated for the .75 inch 24-hour storm and the 10-year 24-hour storm event by PWA (see attached memo.) These sub-drainage areas are shown on Figure 3-36.

170161

A. Washington Blvd. to Drain at Washington Blvd. and Strongs Dr,
B. Anchorage St. Drainage area – over land to Grand Canal
C. Community south of Anchorage St. to Strongs Dr. and drain at intersection of Strongs Dr. and Driftwood St.
D. Community street flow to Driftwood St. overland to Grand Canal

170171

A. Eastwind St. drainage to Grand Canal
B. Fleet St. drainage to Grand Canal
C. Galleon St. drainage to Grand Canal
D. Hurricane St. drainage to Grand Canal

170998 –Via Dolce
Unnamed area east along Washington Blvd. – Via Dolce Extension

Figure 3-35
Grand Canal Sub-Drainage Areas

3.4.3 Pollutants of Concern

The table below shows the expected stormwater runoff pollutants from the land uses in the watershed. Given concerns in the down stream waters of Ballona Lagoon, Marina del Rey boating harbor, and Santa Monica Bay beaches, bacteria and trash are the pollutants of most concern.

Figure 3-36
Expected Pollutants by Land Use Type

Type of Land Use	Types of Pollutants Expected
High Density Residential	• **Sediment/Turbidity** • **Nutrients** • **Trash and Debris** • **Bacteria and Viruses (P)** • **Oil and Grease (P)** • **Pesticides**
Commercial	• **Trash and Debris** • **Oil and Grease** • **Metals**

(P) Potential

3.4.4 Field Visits and Observations of Existing Conditions

As shown in the following photos, flows from the drainage areas along the Grand Canal to the Canal have resulted both in erosion of various levels of severity at each entry point and in contributions of pollution.

Figure 3-37
Hurricane Street

Figure 3-38
Galleon Street

Figure 3-39
Galleon Street

Figure 3-40
Fleet Street

Figure 3-41
Eastwind Street

Figure 3-42
Driftwood Street

Figure 3-43
Anchorage Street

Figure 3-44
Anchorage Street

3.4.5 Locations with Existing BMPs

Two locations where drains discharge stormwater to the Grand Canal are at the intersection of Washington and Strongs Dr., and at the intersection of Via Dolce and the city –owned property across from Driftwood. StormCeptors have been installed on both of these drains reducing sediment discharges to the Grand Canal.

Figure 3-45
Strongs at Washington Blvd.

Figure 3-46
City Property Adjacent to Via Dolce

Figure 3-47
Drain at Grand Canal from Via Dolce and Unnamed Watershed

3.4.6 Volume .75" Storm Event

Figure 3-49 shows the volume discharged from Grand Canal Sub-Drainage Areas during the .75 inch 24-hour storm event.

Figure 3-48
Volume Discharge from Grand Canal Sub-Drainage Areas

0.75" 24-hour Storm Event

Area	Volume [ft3]	Volume [ac-ft]
170161A Washington Blvd. to Strongs Dr.	3,269	0.08
170161B Anchorage across Strongs Dr.	3,711	0.09
170161C Buccaneer St. and Catamaran to Strongs Dr.	10,935	0.25
170161D Driftwood St.	6,980	0.16
170171A Eastwind St.	4,630	0.11
170171B Fleet St.	6,481	0.15
170171C Galleon St.	1,989	0.05
170171D Hurricane St.	8,419	0.19
170998	29,731	0.68
Unnamed	35,773	0.82
Total	**111,917**	**2.57**

3.4.7 10 Year Storm Event

Table 3-3 shows the volume discharged from Grand Canal Sub-Drainage areas during the 10-year storm event.

Figure 3-49
Volume Discharge from Grand Canal Sub-drainage Areas

10-year storm event

Area	Volume [ft^3]	Volume [ac-ft]
170161A Washington Blvd. to Strongs Dr.	16,813	0.39
170161B Anchorage across Strongs Dr.	19,085	0.44
170161C Buccaneer St. and Catamaran to Strongs Dr.	56,232	1.29
170161D Driftwood St.	35,898	0.82
170171A Eastwind St.	24,848	0.57
170171B Fleet St.	34,787	0.80
170171C Galleon St.	10,675	0.25
170171D Hurricane St.	45,186	1.04
170998	153,276	3.52
Unnamed	184,425	4.23
Total	**581,225**	**13.34**

4.0 Alternatives Evaluation

Two alternatives for physical changes to the Grand Canal area have been developed and examined. The objectives of these approaches are to establish a balance of ecological habitat types, address endangered species and exotic species concerns, increase stability of the banks, improve water quality through improved stormwater management, and balance public access, flood protection and protection of wildlife. Both alternatives are based on the recommended hydrological structure and operational regime and provide somewhat different mixes and benefits of public access, stormwater management and biological restoration.

Hydrology – The recommended hydrology approach is to maintain the structural changes of the tide gate rehabilitation under way, but to modify it operationally in order to maximize the winter period tidal regime to allow for the most inundation of wetlands plant species. Also by reducing the duration of restricted tidal range and residence time, this operational approach would reduce the duration of freshwater inundation following flood events.

Key recommendations as to operation of the gates are:

- The Marina del Rey tide gates should be operated so that the Wet Mode is only implemented in response to storm forecasts. An analysis of 13 years of daily rainfall in Santa Monica provided a hindcast estimate of the annual frequency at which the gates would be operated in Wet Mode. If the Wet Mode was implemented for two days on either side of any rainfall 0.25 inches or greater, the gates would have been set to Wet Mode for an average of 13% of the 13-year precipitation record. For the driest (2002) and wettest (2005) water years of this record, Wet Mode would have been in effect 7% and 20% of the time, respectively.
- The Washington St. tide gates should not be opened for extended periods of time. When the culverts were open, high tide water levels decrease and low tide water levels increase by a similar magnitude of 0.3 to 0.6 feet. Even if the culverts were opened for a maximum of three 6-hour periods per week (10% of the time), the impacts on the integrated water level statistics (MHHW, MLLW, annual inundation frequency, etc.) should be small.
- An Operations and Maintenance plan should be developed as described in the Hydrology Appendix.

Because public access treatment provides the most distinguishing differences between the alternatives, the alternatives are presented with access discussed first.

BRIDGE

During analysis of the existing conditions, two locations were considered for a pedestrian bridge over the lagoon. The first location was at the terminus of Hurricane Street,

connecting the west side of the lagoon to the open lot on the east bank of the canal, and the second location was at the terminus of Driftwood Street, connecting the west side of the lagoon to the open lot adjacent to the County housing on the east side of the lagoon. The location at Driftwood Street proved to be more beneficial to both wildlife and public access. With regard to wildlife, placing the bridge at Hurricane Street would create a barrier for wildlife between the Grand Canal and the Ballona Lagoon Marine Preserve, as many species will not pass under a bridge due to the shadow cast on the water. Although locating a bridge at Driftwood Street would create a similar type of barrier, the ecological benefits of extending the wildlife habitat of an already thriving ecosystem in Ballona Lagoon Marine Preserve are greater than the benefits of creating contiguous habitat within the relatively small Grand Canal. In terms of access, placement of the bridge at Driftwood Street maximizes pedestrian flow by keeping this key connection point within the urban zone, which experiences higher pedestrian traffic flow than the natural zone. Additionally, maintaining the bridge within the urban zone directs the majority of pedestrian traffic away from the more sensitive ecological areas. Therefore, in both alternatives, the installation of a pedestrian bridge at the intersection of Strongs Drive and Driftwood Street is recommended. The proposed bridge consists of a pre-engineered structure that mirrors the style seen throughout the Ballona area. In order to avoid disturbance to the lagoon's fragile ecosystem, the footings of the proposed bridge should be located at the lagoon's outer edges (see Figure 4-1). The concave shape of the bridge blends well with other pedestrian bridges in the regional scale, such as historic bridges located the Venice Canals, Ballona Lagoon Marine Preserve and Ballona Creek.

Figure 4-1
Pedestrian bridge example from the Venice Canals

4.1 Alternative 1

Alternative 1 is shown in Figure 4-2, below.

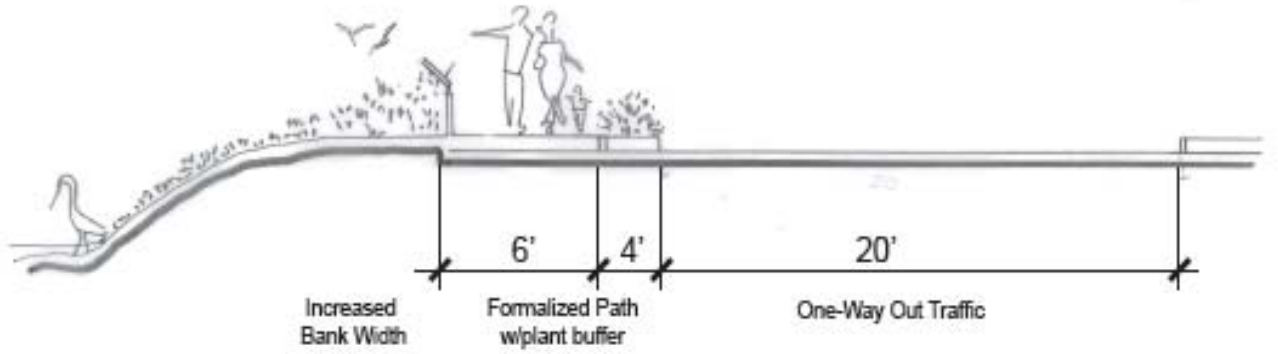
Figure 4-2
Alternative 1

4.1.1 Pedestrian Circulation

In alternative one, pedestrians will be able to access Grand Canal through a walking trail on both the east and west side of the Canal Banks.

The **west side** of the Canal bank along Strongs Drive will have a defined six-foot pedestrian trail adjacent to a three-foot high fence that will provide shelter to proposed biological restoration and will be installed adjacent to all walking paths along the Canal in order to avoid trampling of vegetation.

Figure 4-3
Section view - west side of the Canal bank along Strongs Drive



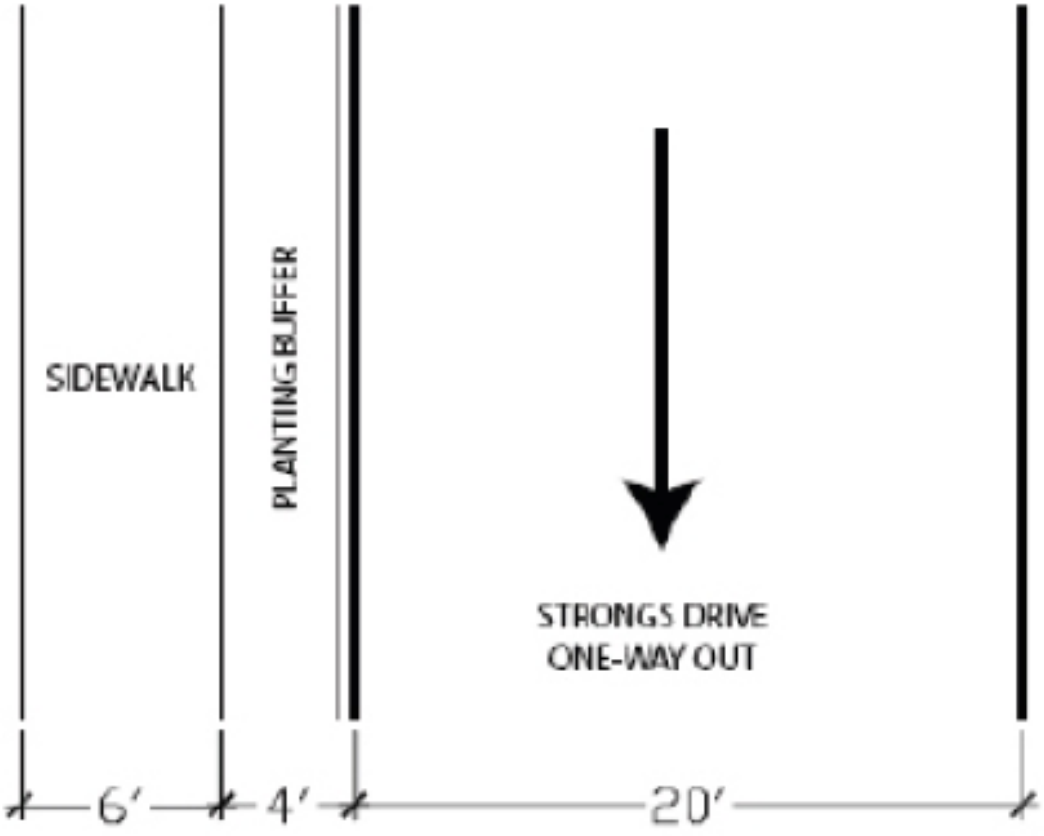
The new trail will connect with the existing concrete pathway running from Strongs Drive and Driftwood Street to Hurricane St. connecting eventually with the not yet restored west bank of the Ballona Lagoon Marine Preserve. A pedestrian bridge will be located at the intersection of Strongs Dr. and Driftwood St., providing pedestrians the

ability to cross over to the east side of Grand Canal. The bridge will lead visitors to and from one of the three proposed gateway parks and also to currently underutilized parking along Via Dolce. On the **east side** a new path will be installed from Washington to the new entrance park with a continuation path to the **sidewalk adjacent to Via Dolce**, which will lead pedestrians, through signage, to the entrance of the sand dune park, the second east-side park, or beyond to the entrance to Ballona Lagoon Marine Preserve.

4.1.2 Parking and Vehicle Circulation on Strongs Dr.

A distinguishing factor of this alternative is that, with the addition of a walking path and landscape division from the road from Washington to Driftwood along Strongs Dr., traffic on Strongs becomes one way only and parking is eliminated. Fire Department code can be met with this approach.

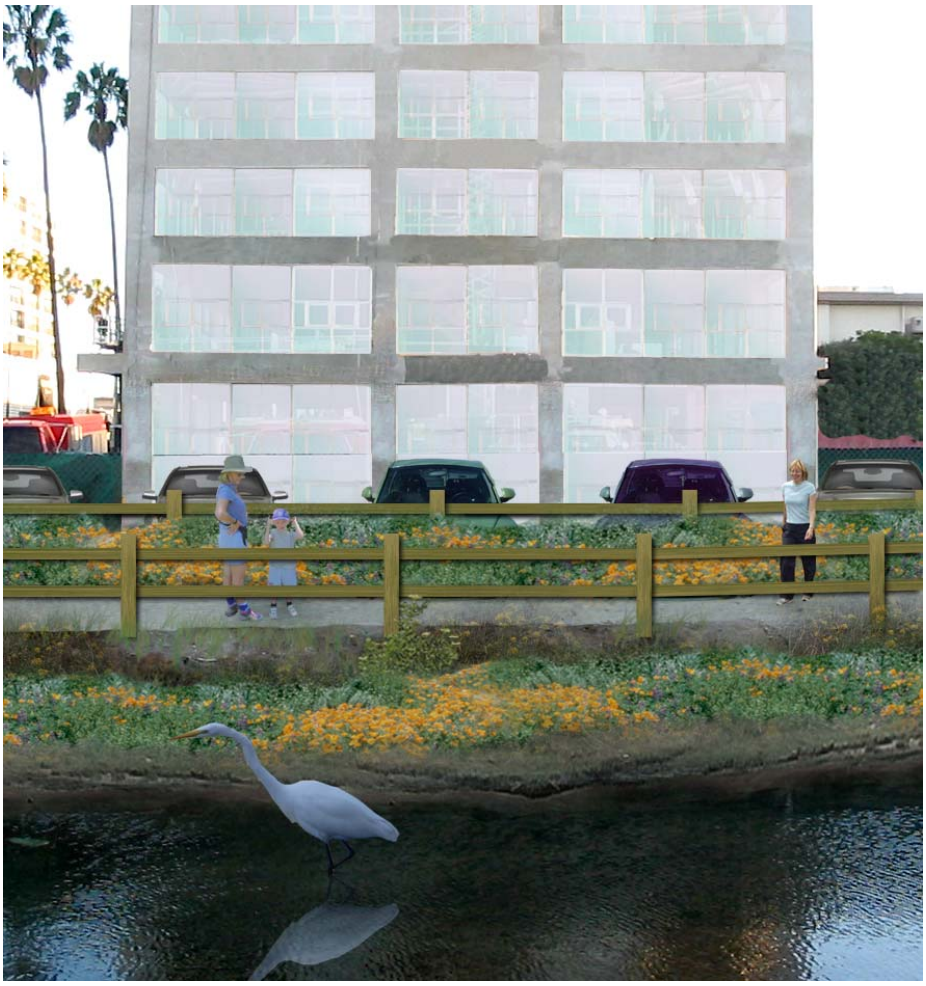
Figure 4-4
Section View – Strongs Drive



4.1.3 Habitat Restoration

Along Strongs Dr., habitat will be restored up to the current curb. Along the east side across from Strongs Dr., non-natives will be removed and native habitat will be planted. (Figure 4-5 is a photo simulation of the east bank closest to Washington Blvd.)

Figure 4-5
Habitat Restoration



Along the houses on the eastern side, the existing concrete path along the canal will be broken and cobble will be added to provide tidal habitat (Figure 4-6). The area from house #3511 to #3621 along the canal will be restored to habitat (Figure 4-7).

The recommended approach to bank restoration is to enhance the bank in its current profile other than where areas have been damaged by erosion. The compacted and degraded topsoil could either be replaced or disked and improved. Existing wetlands

vegetation would be retained and would be enriched with additional native wetland species representative of similar habitats elsewhere in the Ballona Wetlands Ecosystem.

Figure 4-6
Habitat Restoration

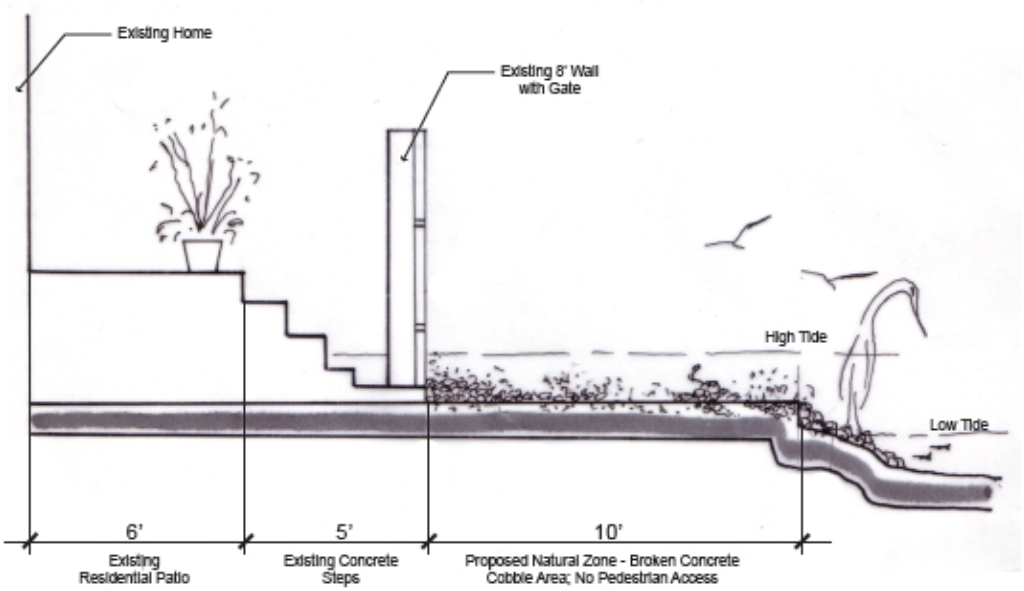
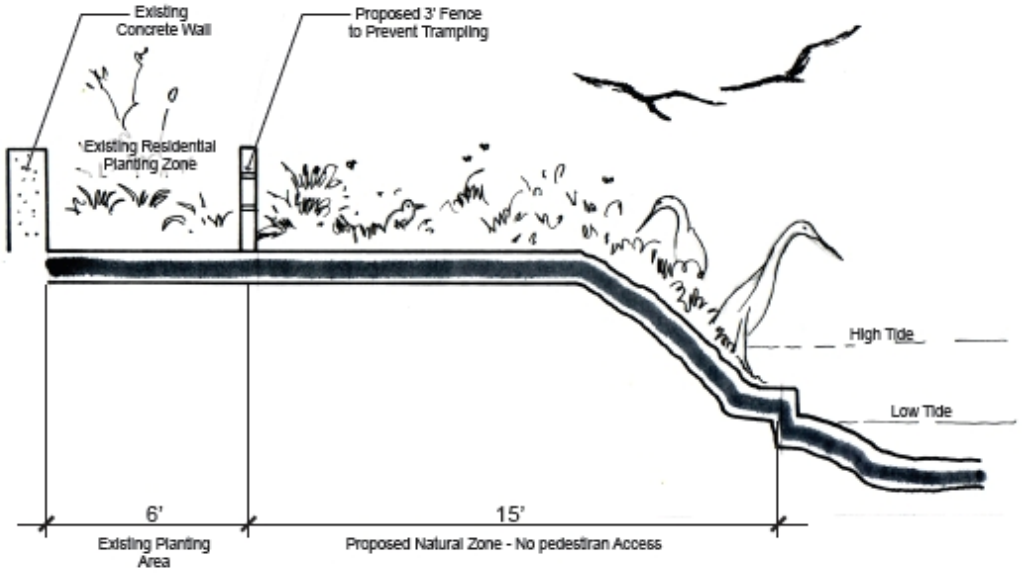


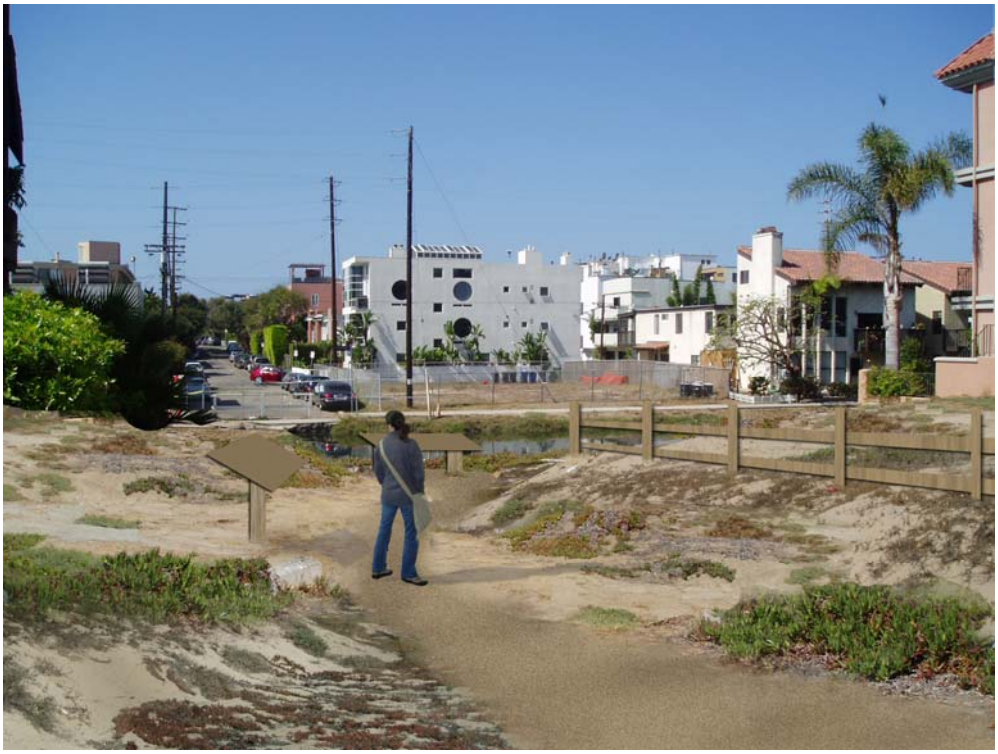
Figure 4-7
Habitat Restoration



A treatment wetlands and intertidal cobblebed is created in the Gateway Park (Figure 4-8). A Sand Dune Park is created across from Hurricane Street (Figure 4-9).

Figure 4-8
Habitat Restoration

Figure 4-9
Habitat Restoration



4.1.4 Stormwater Management

The landscaped separation between the path and the street along Strongs Dr., in this alternative, is principally dedicated to a bioswale/bioretention area that treats runoff along the length of Strongs Dr. minimizing flows reaching Driftwood and managing flows from Washington Blvd. and Anchorage as well. Rain Gardens combined with pervious pavement and Filterra units will be installed to treat stormwater from west side streets dead-ending at the Canal (Galleon St., Fleet St., and Eastwind St.) And Hurricane St. drainage area runoff will be managed in a low flow bioswale – the centerpiece of Hurricane Park. Low flows from the Via Dolce drainage area will be treated with a bioswale/wetlands treatment system also.

4.1.4.1 BMP Sizing

The following table shows the size of BMPs needed to treat the ¾" 24-hour storm event.

Figure 4-10
BMP Sizing

	Drainage Area		Required	Provided	
Basin	**[ac]**	**[sf]**	**V_{PM} [cf]**	**BMP Type**	**V_{WQ} [cf]**
Strong Dr	8.75	381,103	17,915	Filterra[b] (x7)	20,063
				Bio-Swale	5,850
Driftwood St	3.41	148,484	6,980	Rain Garden	750
Sub-Total	12.16	529,587	24,895	Sub-Total	26,663
Eastwind St	3.86	168,022	4,630	Filterra (x2)	1,799
				Rain Garden	1,350
				Pervious Pvmt	1,575
				Sub-Total	4,724
Fleet St	5.40	235,194	6,481	Filterra (x4)	3,601
				Rain Garden	1,350
				Pervious Pvmt	1,575
				Sub-Total	6,526
Galleon St	1.66	72,180	1,989	Rain Garden	1,350
				Pervious Pvmt	1,575
				Sub-Total	2,925
Hurricane St	7.01	305,523	8,419	Filterra (x4)	3,987
				Bio-Swale	2,240
				Pervious Pvmt	2,250
				Sub-Total	8,477
Via Dolce[a]	2.50	108,900	4,247	Filterra (x1)	2,837
				Bio-Swale	1,600
				Sub-Total	4,437

[a]Based on record drawings, surface drainage to proposed bio-swale on Via Dolce is assumed to be about 1/7th of the drainage area 190998 (17.49 ac).
[b]Water quality volume of Filterras are based on the drainage area capacity of Filterras.

4.1.4.2 End Streets

To meet the sizing requirements for the ¾ inch 24-hour storm event, various combinations of rain gardens, porous pavement and filterra units are needed. Examples are shown in Figures 4-11 through 4-15.

Figure 4-11
Proposed Grand Canal Cross-Section Street-End Rain Garden

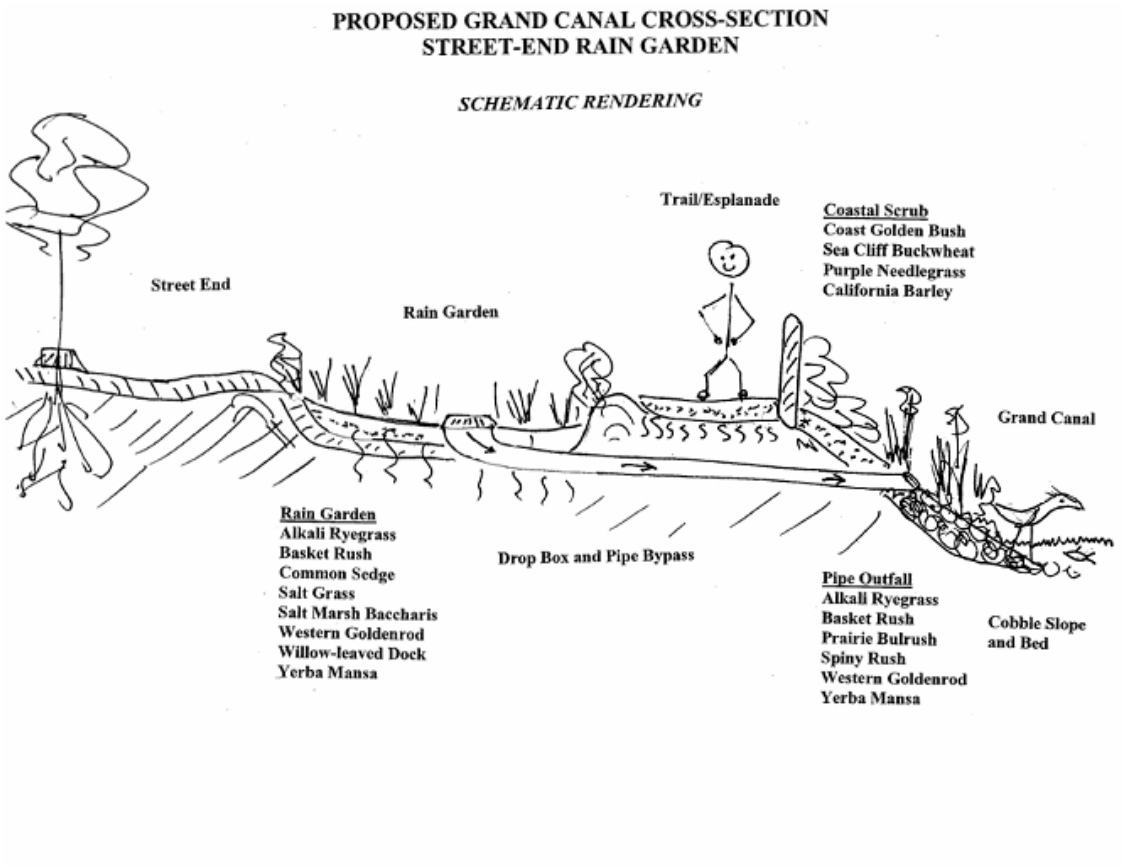


Figure 4-12
Porous Pavement Example

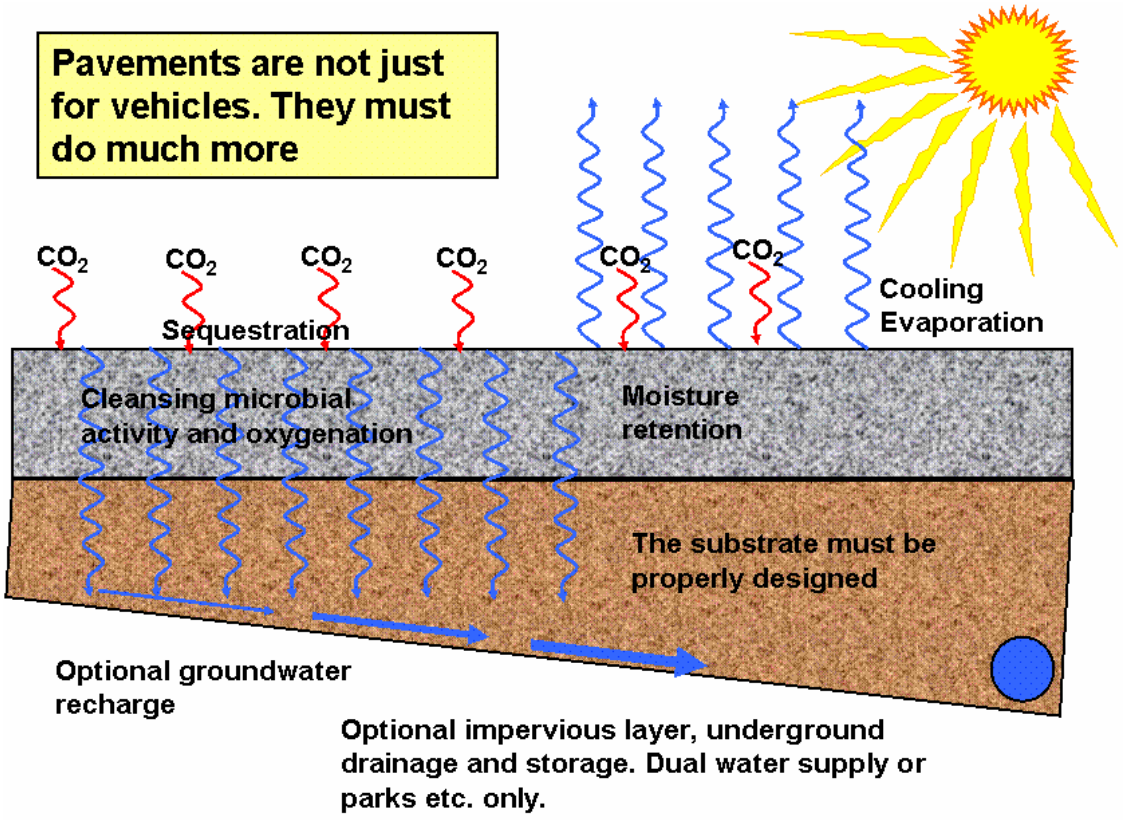
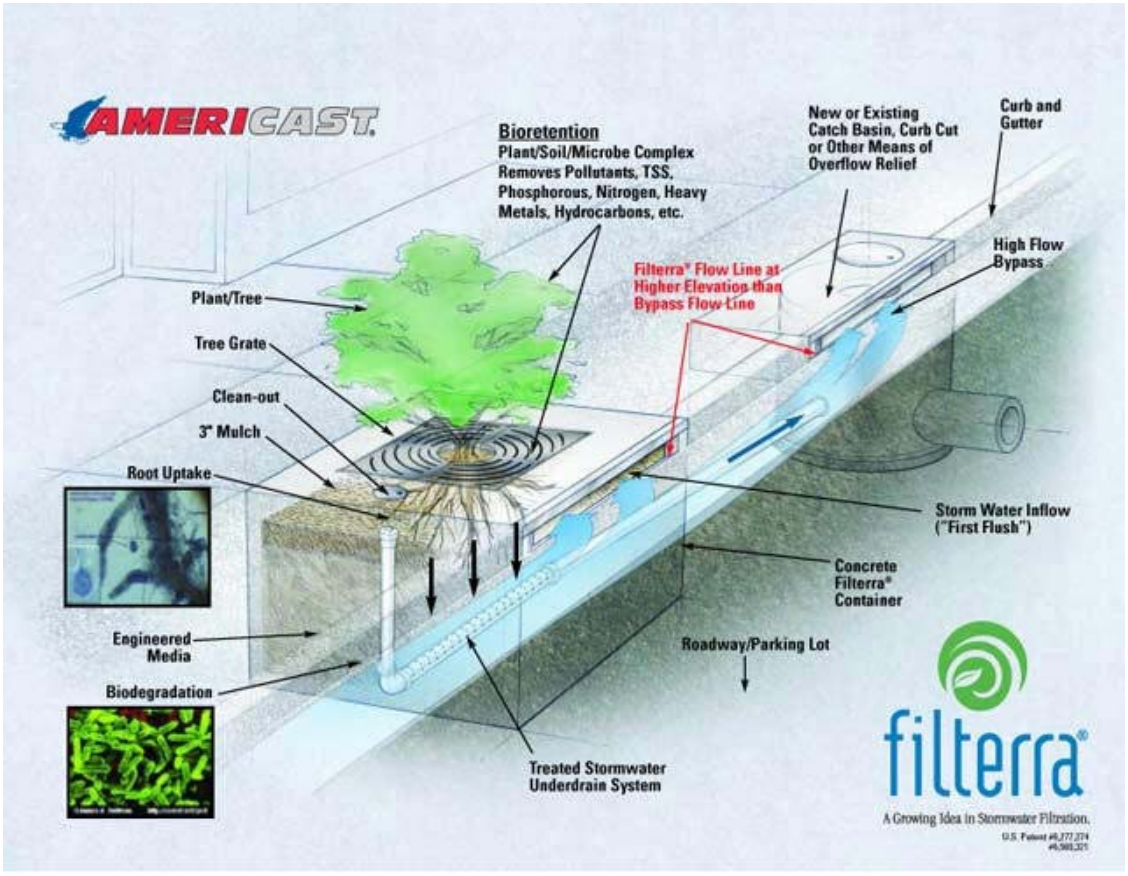


Figure 4-13
Filterra Conceptual Model



4.1.5 Large Drain at Via Dolce, Hurricane Surface Flows, and Strongs Dr.

To treat the ¾ inch 24-hour storm event, a combination of low impact development strategies will be needed. At Via Dolce, the existing drain is at depth that would not allow it to be connected to a bio-swale even for low flow treatments. As an alternative it is recommended that 3/4inch flows from Via Dolce including the nearest storm culvert be captured at street level into a bio-swale/treatment wetlands.

Flows from the Hurricane Street drainage sub-area will also be directed to a bio-swale in the new Hurricane Park. To treat the ¾ inch 24-hour storm event, additional pervious pavement and Filterra units will also be needed.

Strongs Drive flows will be directed to a new trail and bio-swale that will have several Filterra units incorporated in order to accommodate the ¾ inch flows.

Figure 4-14
Bio-Swale Example

Figure 4-15
Bio-Swale Alternative Concept on Strongs Drive

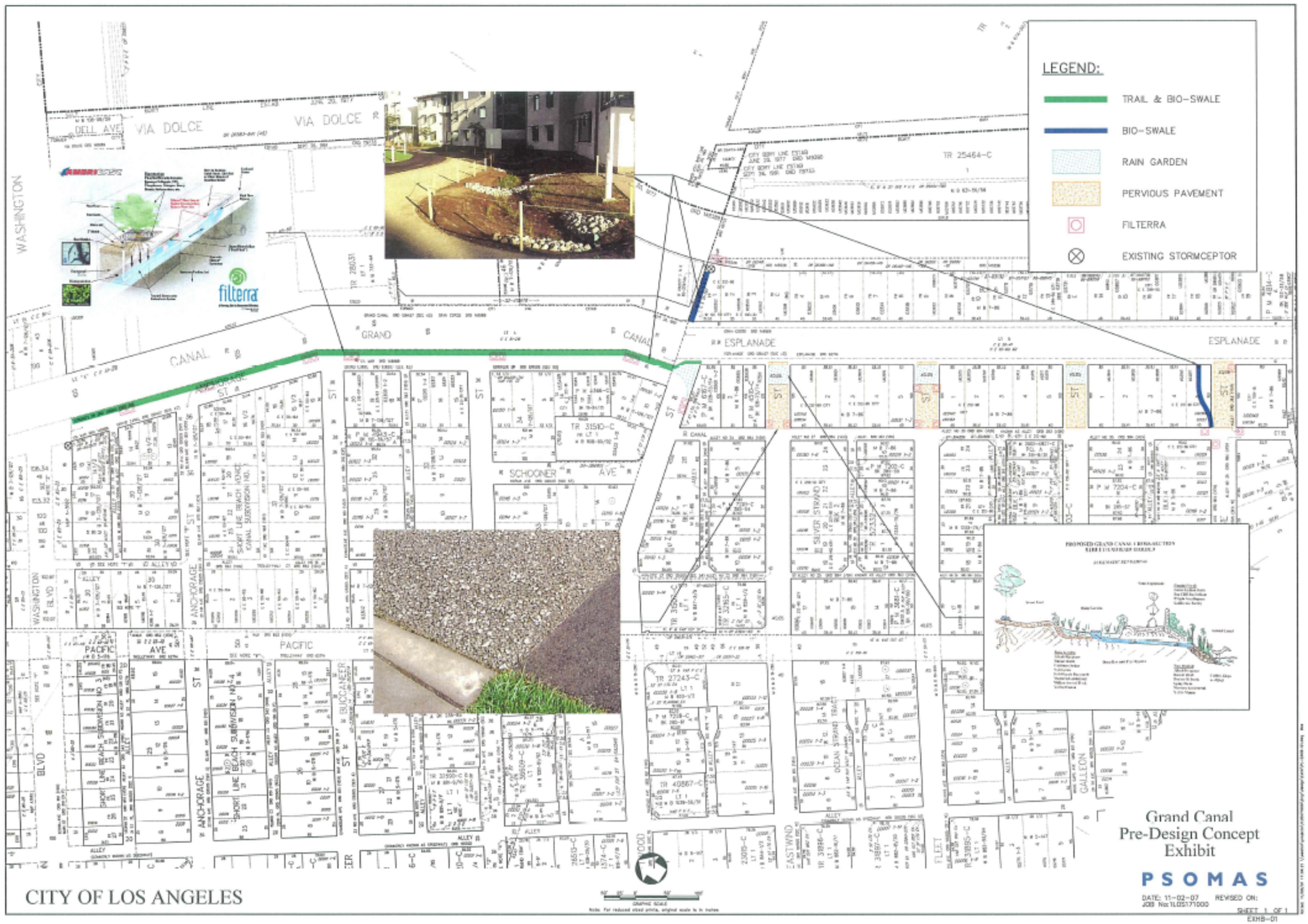
4.1.6 Summary

Figure 4-16
Summary of Recommendations by Drainage Area Location

Area	Existing Condition	Design Solution for ¾ inch 24-hour storm event
170161A Washington Blvd. to Strongs Dr.	Stormceptor treats some flows from Washington Blvd. but some surface flows continue to Strongs Dr,	Treatment train of bio-swale and Filterras along Strongs Dr.
170161B Anchorage across Strongs Dr.	Surface and drain flows directly to Canal causing erosion and without low flow treatment	Same as above.
170161C Buccaneer and Catamaran to Strongs Dr.	Surface flows to Strongs Dr. entering Canal at Driftwood St. via drain causing erosion	Same as above.
170161D Driftwood St.	Driftwood St. surface flows via street end to Canal causing erosion	Rain Garden at foot of Driftwood St.
170171A Eastwind St.	Eastwind St. surface flows via street end to Canal	Rain Garden, Filterra and Pervious Pavement between Alley and foot of Eastwind St.
170171B Fleet St.	Fleet Street drain and surface flow via street end to Canal	Rain Garden, Filterra, and Pervious Pavement between Alley and foot of Fleet Street
170171C Galleon St.	Galleon St. surface flows via street end to Canal	Rain Garden and Pervious Pavement between Alley and foot of Galleon St,
170171D Hurricane St.	Street and areas to south surface flow to end of Hurricane to Canal.	Bio-swale, filterra, and pervious pavement or some alternative needed
170998 Via Dolce	Stormceptor in drain. Pipe at Via Dolce has approximately 5 feet of ground cover making it impractical to connect to a bioswale.	Capture only surface flows from Via Dolce drainage area to bio-swale. Additional flow treatment not feasible at location.
Unnamed	Stormceptor in drain	Additional treatment not feasible at location.

These BMPs can be seen located on the following exhibit, Figure 4-17. A larger version can be found as Appendix A of the Appendix D of this report.

Figure 4-17
Recommendations by Drainage Area Location



4.2 Alternative 2

Figure 4-18 shows the main elements of the second alternative.

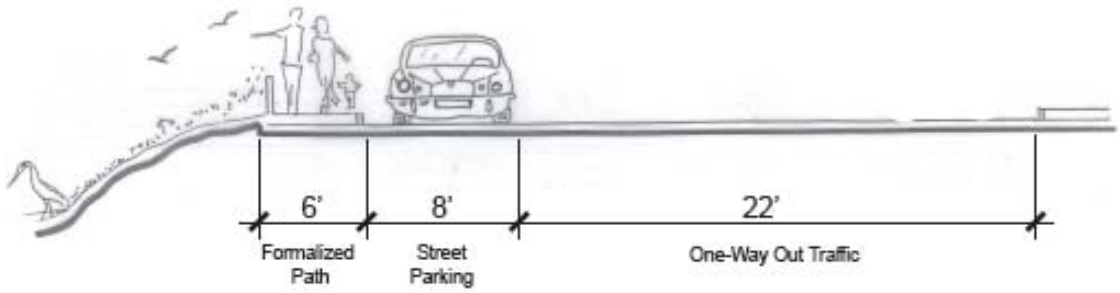
Figure 4-18
Alternative 2

4.2.1 Pedestrian Circulation – West Side

In alternative two, the west side (Strongs Drive) of the Canal bank will have a defined six-foot pedestrian trail which will be installed partly where the top of the bank and informal walking area is now located. There will not be a landscape separation between the path and the road. The same three foot high fence described in Alternative 1 will be used in this alternative. The trail will also connect with the existing concrete pathway beginning at Strongs Dr. and Driftwood St., leading to the end of Grand Canal. A pedestrian bridge will also be located at the intersection of Strongs Drive and Driftwood.

Figure 4-19
Pedestrian Circulation – West Side of Strongs Drive

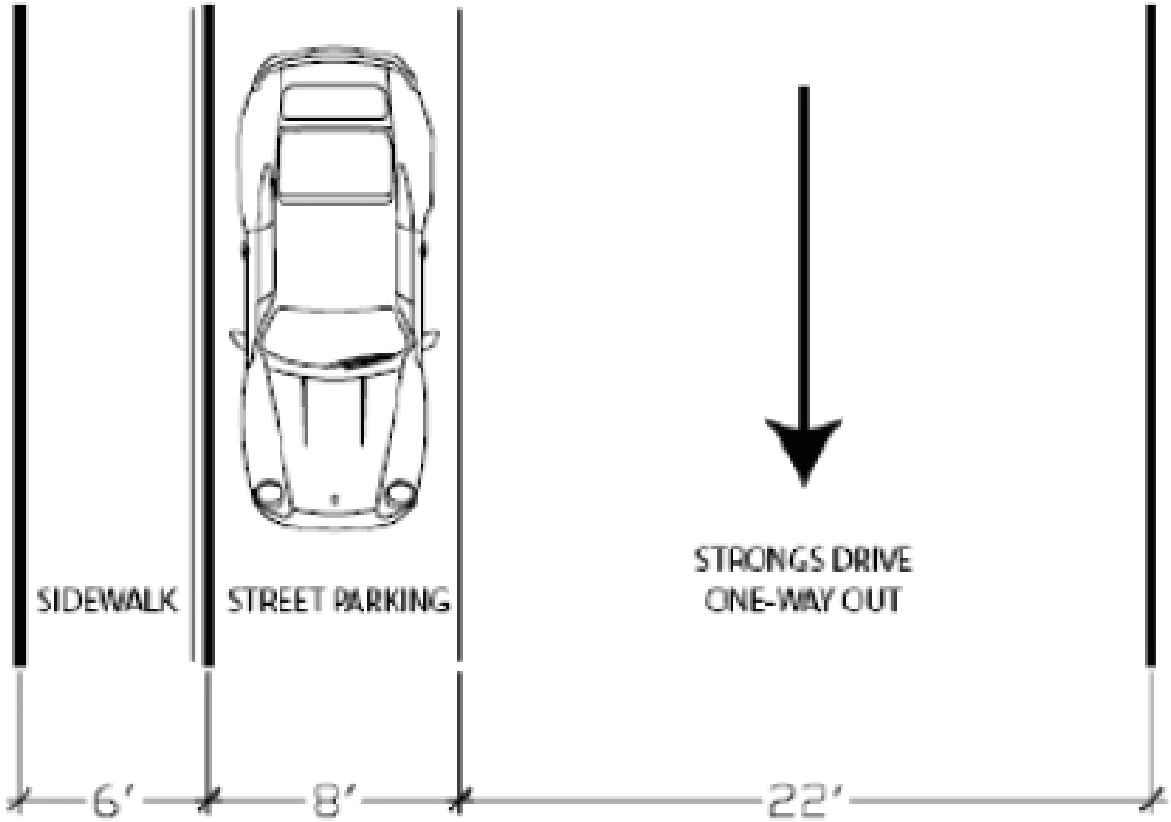
Alternative 2



4.2.2 Circulation and Parking on Strongs Drive

By moving the trail partly on to the bank where the informal trail is now located and by eliminating the landscape buffer, parking can be retained along the eastern side of Strongs with the street running one way only. This alternative also meets fire access code.

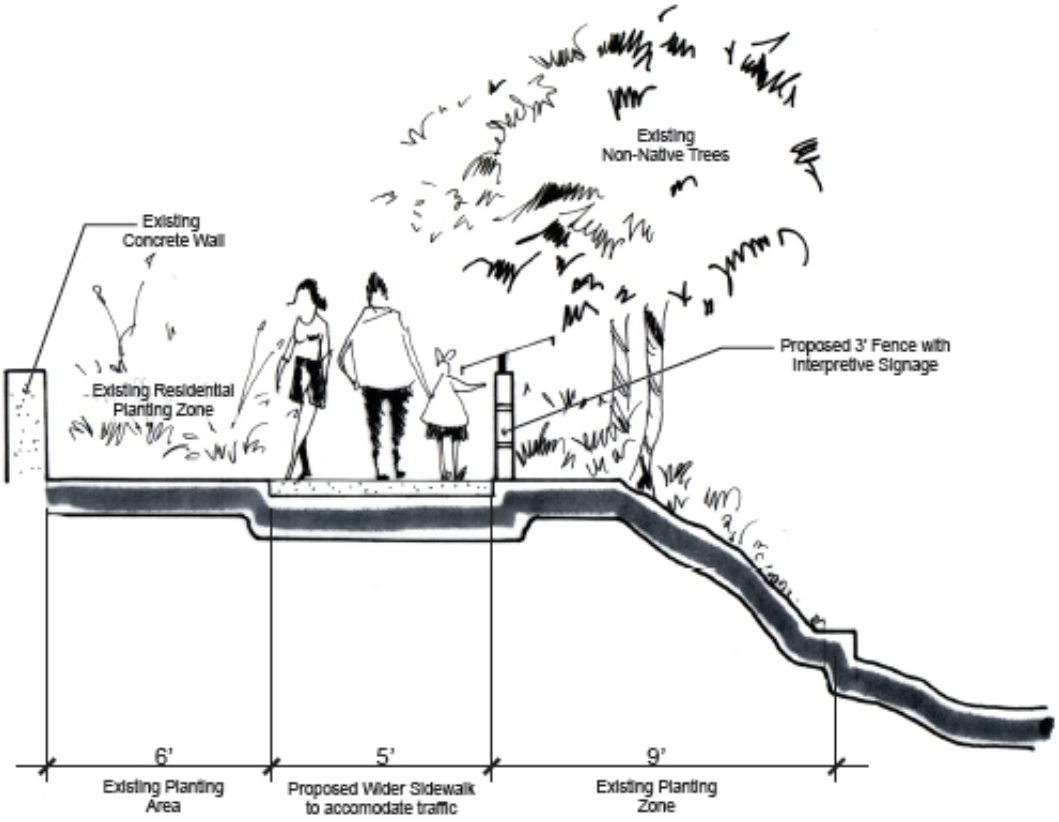
Figure 4-20
Circulation and Parking on Strongs Drive

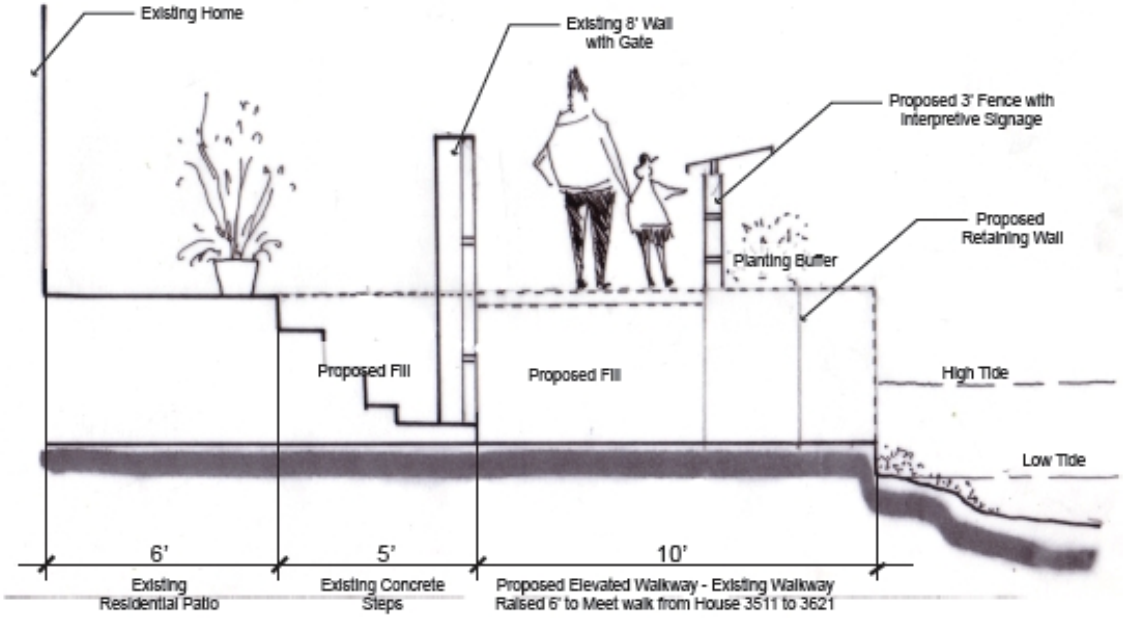


4.2.3 Pedestrian Circulation – East Side

While a pathway will also lead to the sidewalk adjacent to Via Dolce, in this alternative **pedestrians will also have access to the east side of the bank through a walkway from house 3511 to the end of Grand Canal.**

Figure 4-21
Pedestrian Circulation – East Side


Existing
Non-Native Trees
Existing
Concrete Wall
Proposed 3' Fence with
Interpretive Signage
Existing Residential
Planting Zone
6'
Existing Planting
Area
5'
Proposed Wider Sidewalk
to accomodate traffic
9'
Existing Planting
Zone


Existing Home
Existing 8' Wall
with Gate
Proposed 3' Fence with
Interpretive Signage
Proposed
Retaining Wall
Planting Buffer
Proposed Fill
Proposed Fill
High Tide
Low Tide
6'
Existing
Residential Patio
5'
Existing Concrete
Steps
10'
Proposed Elevated Walkway - Existing Walkway
Raised 6' to Meet walk from House 3511 to 3621

4.2.4 Habitat Restoration

Less of the bank is restored along Strongs Dr. in this alternative. Also less habitat is created on the east side as the access adjacent to the canal, where habitat is restored in Alternative 1, is used for pedestrian access.

Figure 4-22
Habitat Restoration

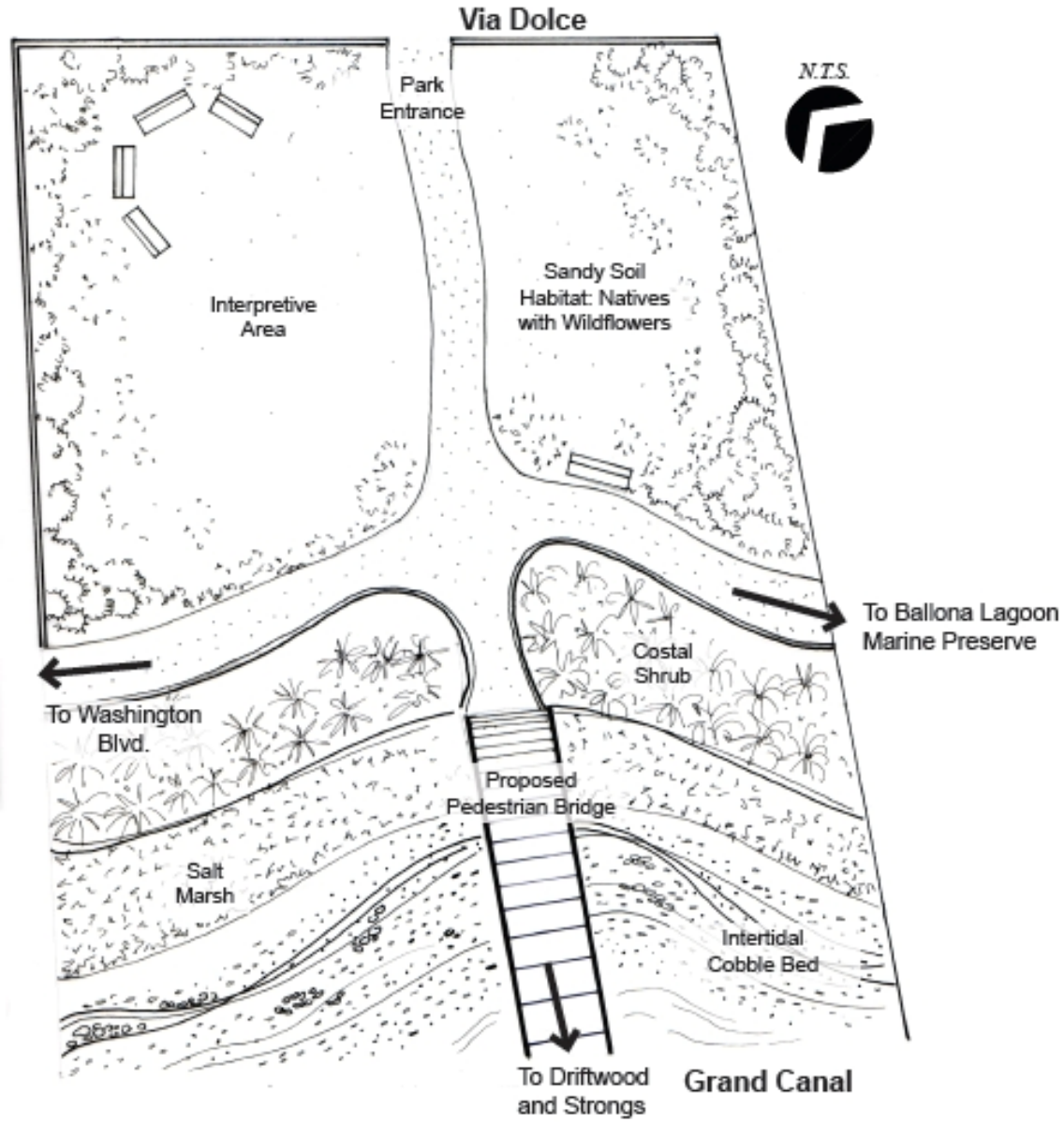
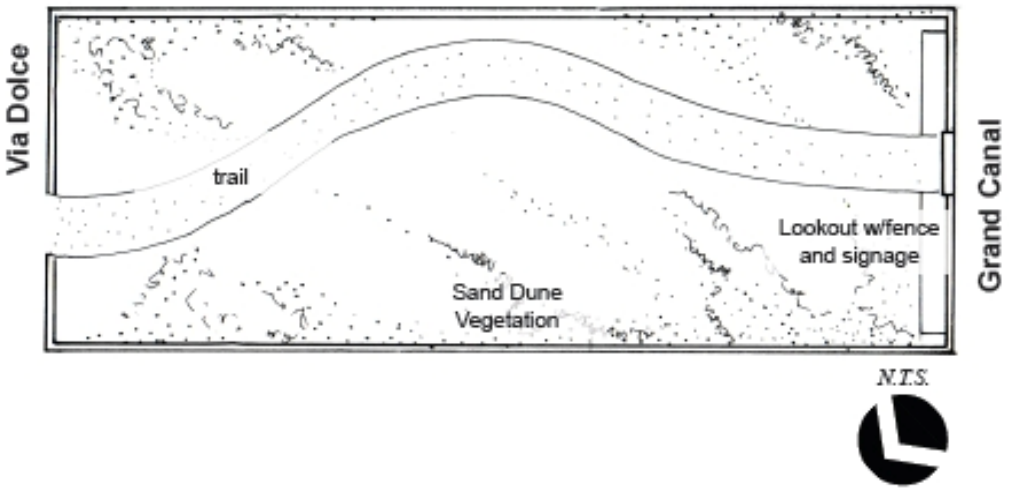
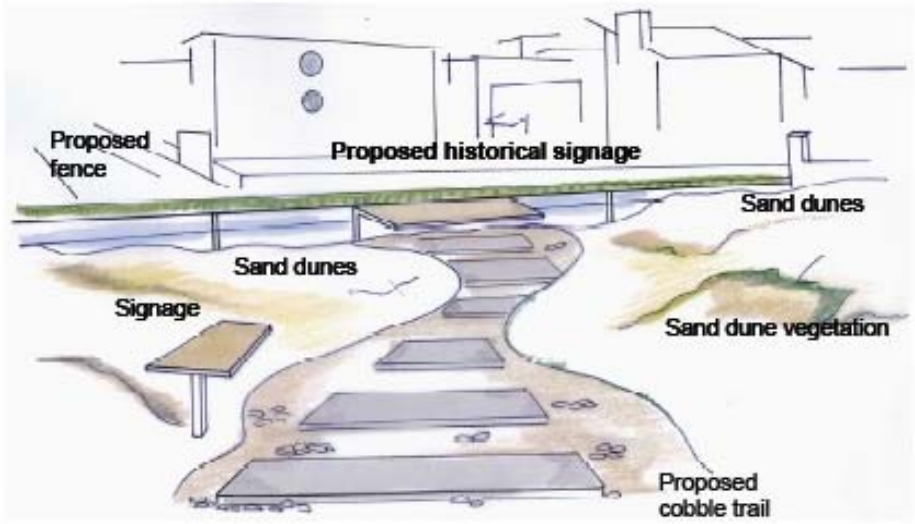


Figure 4-23
Habitat Restoration





4.2.5 Stormwater Management

Because the landscape buffer is not part of Alternative 2, the bioswale along Strongs Dr. is not included. It is replaced, however with a series of Filterra units. Hurricane Park also provides less treatment than in Alternative 1 and Gateway Park has no treatment wetlands/bioswale system. Other stormwater elements remain the same.

5.0 Recommended Alternative and Phasing

5.1.1 Evaluation

5.1.1.1 Alternative 1

Strengths
• Meets City's low impact access recommendations
• Preserves and enhances natural character of Grand Canal
• Increases wildlife watching opportunities
• Enhances pedestrian use of Via Dolce
• Enhances ability to use under utilized parking on Via Dolce
• Maximizes use of existing city lots for public use
• Assists with better fire access on Strongs Drive
• Protects to the greatest extent possible the ecological integrity of an important coastal resource designated as ESHA (Environmentally Sensitive Habitat Area) by the California Coastal Commission

Constraints
• Residents may not respect boundaries on east side of Canal where habitat is restored.
• Parking directly on Strongs Dr. is reduced and must be made up via the walking bridge to parking on Via Dolce
• Cost of removal of structures and non-natives may be elevated
• Coastal Commission permitting may be more complex.
• Possible dispute among home owners
• Cost of park installation may be elevated

5.1.1.2 Alternative 2

Strengths
• Enhanced access
• Enhanced water views for pedestrians adjacent to east side of Canal
• Protects existing access
• Coastal Commission permitting may be less complex.

Constraints
• Possible opposition from some residents
• High cost associated with installation of proper walking path above high tide levels
• Decreased opportunities for wildlife gathering areas
• Decreased protection of ESHA (Environmentally Sensitive Habitat Area) as designated by the California Coastal Commission
• Decreased opportunities for wildlife watching
• Does not meet City's low impact access recommendations

Alternative 1 is the recommended alternative.

5.1.2 Phasing

Projects have been grouped in areas for phasing of implementation. It is recommended that the projects be implemented in the following groupings and possibly in the following order:

8) Stormwater management measures and adjacent bank restoration and trail disability access on end streets with least complex issues. These can be completed most quickly and serve as a model for the others. These are at Galleon, Fleet, and East Wind.
9) East bank from Washington to city property – trail and restoration planting of banks.
10) West Bank from Washington to Driftwood – revise traffic in one direction and restore bank, construct trail and fence and install Strongs Dr. stormwater treatment measures.
11) City property entrance park at Via Dolce, pedestrian bridge, vegetation and habitat restoration and stormwater treatment measures at Park and at Driftwood. Signage for project components to date.

(Number 3 and 4 should be implemented as part one and two of the same project.)

12) Hurricane stormwater treatment park, observation platform, eastside concrete path broken- up into habitat area. Revisions to remainder of east side bank restoration from new entrance park to border with Ballona Lagoon. Completion of educational signage.
13) Complete additional fencing.
14) Sand Dune Park.

6.0 Project Cost Estimate

Pre-Design Concept Cost Estimate
Summary for Recommended and Second Alternative

	Recommended Alternative	Second Alternative
Access	$1,987,096.00	$957,536.00
Biology	$2,689,945.00	$2,441,344.00
Storm Water	$2,290,536.00	$2,054,014.00
TOTAL	**$6,967,577.00**	**$5,452,894.00**

7.0 Project Implementation Issues

To proceed to project implementation, a number of issues must be addressed. These include:

- The City has not allocated funds for project design and construction;
- Funding from grants and other sources may need to be pursued;
- Permits will need to be obtained including Coastal Commission permits;
- The City Department of Transportation will need to approve access and one-way street configurations, and issues related to non-standard street sizes;
- Maintenance issues and responsibilities will need to resolved;
- Operational details for the tide-gates will need to be resolved;
- A geotechnical analysis and detailed survey should be performed;
- A traffic consultant will need to confirm parking and traffic configurations;
- Park implementation will require buy-in from multiple City departments and agreements relative to long term needs.

APPENDIX A
Hydrology Modeling

APPENDIX B
Public Access

APPENDIX C
Biological Resources

APPENDIX D
Storm Water Recommendations

APPENDIX E
Cost Estimates and Budget Guidelines for Recommended and Second Alternatives

APPENDIX F
Utility Constraints

APPENDIX G
Public Input from the Final Draft Report Presentation